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Access Management Processes in Cargotec's Financial Reporting Systems

An approach to improve throughput time and increase quality

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This study investigates the access management process for a globally implemented financial reporting system. Through this research the goal is to find inefficiencies and bottlenecks in the process which prohibit the access management process from running at optimal speed.

Best practices from the fields of operations management and business process design are synthesized to create a conceptual framework which incorporates the concepts at the heart of well-designed and well-implemented business processes.

The conceptual framework is applied to the existing access management process to isolate weaknesses and vulnerabilities. Thereafter the conceptual framework is utilized to create the outcome of the study, a remodelled access management process.

The redesigned access management process focuses on creating value for the case company and is structured to run in a streamlined fashion. The new process eliminates a significant amount of manual work and gives ownership of the process to the process customers.

Keywords	access management, business process, efficiency, effectiveness

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1 Cargotec Introduction & Business Problem Background

1.1 Cargotec Introduction

Cargotec designs, manufactures and sells cargo handling equipment. Based in Finland, Cargotec had sales over 3.3 billion EUR in 2012 with a gross profit of approximately 640 million EUR. Cargotec operates on a global scale with over 750 locations spread across more than 120 countries.

In order to maintain a clear operational focus across all organizational units, Cargotec has formulated a mission and vision which serves to focus and drive its corporate strategy. Cargotec's mission is to improve the efficiency of cargo flows, and Cargotec's vision is to be the world's leading provider of cargo handling solutions. Cargotec's mission and vision are realized in the core values which are heavily featured in Cargotec's day to day operations as well as in their overall corporate strategy. The core values are:

- global presence – local service
- working together
- sustainable performance

Clearly identifying these core values and incorporating them into the corporate culture helps Cargotec to create an environment where the needs of the customers are paramount and provides the framework which the Cargotec management can use to ensure Cargotec's operations run in an optimal manner.

Cargotec's first core value is global presence – local service. This value is apparent in the fact that Cargotec is a global company, which employs a diverse workforce, encourages cross-cultural interaction and brings its goods and services to the customer's home market.

Cargotec's second core value is working together. This value is demonstrated in the fact that Cargotec's unique combination of global presence and local service would not be possible without people from around the globe working together towards the same targets and goals. In the Cargotec philosophy, collaboration encompasses both internal processes and customer relationships.

Cargotec's third core value is sustainable performance, which is omnipresent in all of its operations. Cargotec's commitment to sustainable business serves to reiterate the ambitions and vision of the corporate strategy. For Cargotec's customers and other stakeholders, sustainable performance translates into reliability, high uptime, competitiveness and profitability. Sustainable performance also means developing solutions that comply with the highest environmental standards.

The vision and mission Cargotec has set forth are to be realized within three distinct business areas: Hiab, Kalmar and MacGregor. In addition to new product sales within each of the three business areas, Cargotec also provides continuous maintenance, support and spare part sales for their products. These additional support operations are organized under the Services heading and are incorporated into each business area respectively. The service function for each business area provides Cargotec an opportunity to ensure the customer is achieving maximum utility from their Cargotec product through its entire life cycle as well as generating a continuous revenue stream after the new product sale has been completed.

The Hiab business area produces on-road cargo handling products & solutions utilized in moving diverse goods and materials. Typical products are loader cranes, forestry and recycling cranes, demountables, tail lifts and truck-mounted forklifts. The customer base is varied and amongst others includes the construction, forest, industrial manufacturing and waste management industries.

The Kalmar business area produces cargo and load handling solutions used in shipping ports, shipping terminals, shipping distribution centres and within heavy industries. Commonly, Kalmar products are utilized in the loading and unloading of container ships. Besides port cranes Kalmar also provides automation software to enhance the efficiency of port operations.

The MacGregor business area offers solutions used in marine transport and in the offshore logistics market. Typical products include hatch covers, RoRo ramps and cargo securing equipment. MacGregor's customer base is more limited than Cargotec's other business areas as the MacGregor products and services are designed specifically for

transport companies and fleet operators. MacGregor products are installed and maintenance services are performed directly on the customer's ship fleet.

The demand for Cargotec products is driven by the viability of the overall world trade market and by extension the needs of the transportation industries. Cargo primarily serves the land and sea transportation industries and their key market drivers have been identified in Figure 1.

- World trade development
- Cargo volumes and container traffic
- Investments in ports and logistics terminals
- Ship building
- Truck registration
- Construction industry activity
- Offshore industry activity including deepsea oil drilling

Figure 1. Global drivers for Cargotec products and services (Cargotec, 2013, p.10)

Cargotec is dependent on a healthy global economy in order to ensure there is a steady and stable demand for its products. Since the global economic downturn at the end of the 2010 decade there has been a great deal of uncertainty in Cargotec's market outlook.

In 2012 Cargotec had sales of over 3 billion euros for the second consecutive year since 2008. While Cargotec's sales figures are comparable to the levels prior to the global economic downturn, Cargotec's operating profit in 2012 was only 3.9% of total sales. Cargotec's Key Figures for 2011 are detailed in Figure 2.

During 2012 within the Hiab business area, the US market showed steady, positive development throughout the year. In Europe however demand slowed during the second half of the year due to the general economic uncertainty. The main target during 2012 was to improve profitability, and this target was achieved as Hiab's operating profit margin picked up in 2012 when compared to 2011.

Consolidated statement of income		2012	2011	2010	2009	2008
Sales	MEUR	3,327	3,139	2,575	2,581	3,399
Exports from and sales outside Finland	MEUR	3,260	3,078	2,516	2,530	3,280
Operating profit	MEUR	131	207	131	0	174
% of sales	%	3.9	6.6	5.1	0.0	5.1
Operating profit excluding restructuring costs	MEUR	157	207	142	61	193
% of sales	%	4.7	6.6	5.5	2.4	5.7
Income before taxes	MEUR	122	192	101	-27	145
% of sales	%	3.7	6.1	3.9	-1.0	13.5
Net income for the period	MEUR	89	149	78	7	121
% of sales	%	2.7	4.8	3.0	0.3	3.6

Figure 2. Key figures from Cargotec's 2012 annual report (Cargotec, 2013, p.134)

In the Kalmar business area, the demand for smaller container handling equipment for ports continued to be strong during the first half of the year despite the challenging market situation. However, this demand slowed towards the end of the year due to increasing economic uncertainty in Europe. Demand for large projects and automation solutions was brisk and an overall positive indication for the business area.

MacGregor achieved a strong result despite a challenging market environment. MacGregor showed a strong order intake both in offshore and merchant shipping, and 2012 was an excellent year for the bulk handling division.

While overall Cargotec sales have recovered to almost the same levels recorded in 2008, the financial results are quite unstable due to the volatility of the global markets. Furthermore the results do not quite meet the expectations that were expressed as Cargotec's strategic financial targets, outlined in Figure 3.

In 2012 Cargotec's financial targets were achieved in two of the four cases. Cargotec's gearing ratio and dividends as related to earnings per share were both within the target ranges. However, the annual sales growth and operating profit margin were both short of their 10% goals. The increasing trend in the gearing ratio during 2012 and well as the decreasing trend in both annuals sales growth and operating profit margin underline the importance for Cargotec to stabilize their sales figures and work actively to grow their sales revenues and control costs in order to maximize the operating profit.

- Annual sales growth exceeding 10 percent, including acquisitions
- Raising the operating profit margin to 10 percent
- Gearing below 50 percent (over the cycle)
- Dividend at 30–50 percent of earnings per share

Figure 3. Cargotec's financial targets and 2012 results (Cargotec, 2013, p.12-13)

Cargotec's operating profit target has not been achieved in the past five years. As a result, the overall corporate strategy is not being fully realized. In order to achieve the target for its operating profit and by extension realize the corporate strategy, Cargotec will either need to increase operating income or reduce operational expenses.

The sales growth Cargotec experienced during 2012 was meagre. Realistically, a significant turnaround in sales will be difficult due to the current market conditions for each of the business areas which are proving to make immediate improvements in sales growth difficult. Therefore, Cargotec is constantly monitoring their markets for developments and actively evaluating different options to increase operating profit through products innovations, differentiation as well as enhancing and ensuring overall business process efficiency.

At its core, Cargotec exists to bring value to its customers. Reflecting this concept, Cargotec's strategy is founded on one clear aspiration: offering optimum cargo handling solutions to our customers, in order to help them succeed in their businesses.

Cargotec's vision is to be the world's leading provider of cargo handling solutions, with the long-term goal of growing faster than the industry average. Furthermore, Cargotec believes that a company's strategy must always start with what the company can do for its customers. Hence, customer perspective lies at the heart of Cargotec's strategy. As a result, Cargotec's internal structures are not set in stone: they have, and will, adapt and evolve according to client needs and the business environment.

Cargotec is currently in the process of transforming into an organisation which is more business-area driven. Key issues driving this strategic choice include maximising shareholder value, improving cash flow and increasing profitability in all operations. Through these actions, the goal is to facilitate faster decision-making and to improve efficiency. These changes call for agility and a forward-looking outlook from Cargotec's entire workforce. Although Cargotec is working concurrently on several different development areas, the strategic focus areas remain customers, services, emerging markets and internal clarity.

1.2 Business Problem

Cargotec's four strategic areas have been outlined as customers, services, emerging markets and internal clarity. These four areas should provide guidance and direction for the entire company, and every unit and function should work to ensure their operations contribute to progress in these focus areas.

Cargotec has established a Group Controlling organization within its Finance function which is responsible for fulfilling the statutory reporting requirements as well as the management reporting. In order to fulfil these requirements, the Group Controlling organization has developed a suite of financial reporting applications which are used throughout the corporation to provide a single repository where all critical financial figures are available.

Cargotec's financial reporting applications are based on two different platforms. The statutory reporting (actual reporting) is done on top of Oracle Hyperion Financial Man-

agement (HFM). The management reporting (forecasting & budgeting reporting) is done on top of Oracle Hyperion Planning and Oracle Hyperion Essbase (Planning). Both the statutory reporting and management reporting is carried out on a monthly basis. The general reporting timetable starts the last week of the month and extends through the first week of the subsequent month.

All of Cargotec's financial reporting applications (both the statutory reporting and management reporting) consist of four key components regardless of their platform they use: data collection, data verification, data consolidation/aggregation and data distribution. The data collection phase consists of controllers across the globe entering their monthly results into the HFM applications as well as any updates to their forecasted figures into the Planning applications. The data verification phase is done is done in two phases. In the first phase, the systems are able to provide immediate reports after the data is entered which can be used by the controllers to verify their data has been entered correctly and no immediate issues can be detected. During the second phase, there are designated users within Cargotec's global controlling organization which are responsible for verifying the integrity of the data within their organizational unit. In practice the different business areas are responsible for ensuring the data entered by their reporting units is sound. The data consolidation phase is a system-side process by which the collected data is aggregated according to various predefined hierarchies. The consolidation phase allows the business area controllers to have an aggregated overview of all the data from their reporting units. The consolidation phase also allows the controllers working at the Cargotec level to see consolidated data from all three business areas. The data distribution phase is where the final data is extracted from the reporting systems and distributed to the management according to certain predefined specifications.

While the Hyperion Financial Management and Hyperion Planning platforms are distinct software packages, these two platforms share certain common elements out of necessity such as the user authentication and authorization modules. For example if a controller is given access to update the data for a reporting unit's statutory reporting the same user will be required to update the management reporting data. In practice this means both the statutory and management reporting share the same security layer, and in principle the access rights given in one platform should also be given in the other platform.

In order to achieve a stable environment where both the statutory reporting and management reporting function in an efficient manner the application's metadata for all reported entities, products, sales markets, etc. needs to be uniform across all the Hyperion Financial Management and Hyperion Planning applications. For example, the definition of a sales company will be the same in both platforms, and the definition of a Cargotec product will be the same in both platforms.

In accordance with the needs and requirements of the controlling community the applications are developed and modified to suit the needs of the business. New products can be added or existing products can be merged, sales offices may move from one country to another, etc. As the reporting is done a monthly basis these development items are available to the end users at the start of the reporting period with 12 distinct applications configurations per year (one per month). The applications are maintained centrally ensuring any application changes are pushed simultaneously to all users. The application development as well as the technical support is carried out primarily in Finland.

The technical support for the financial reporting applications is critical as it ensures the users are able to work with their applications unimpeded. While there are many unique cases and support issues, the most common type of technical support issue is when users do not have access to a specific element in the applications. This is usually caused by one of two reasons.

1. A new member is created in the applications but the security configuration does not include all required users. For example, if a new product for the North American market is introduced and access to the product is granted to business controllers in the United States, but not to a specific sales office in California
2. A new user is required in the system, or an existing user needs to have broader access rights

According to the support process currently implemented at Cargotec, all support tickets are handled via a ticketing system which is available 24 hours a day. While the support ticket is processed and allocated to the technical support staff 24 hours a day, the requests are only processed during regular business hours in EMEA as they need to be reviewed individually by the support staff working in Finland. Due to the fact that the

financial reporting applications are open approximately 2 weeks each reporting cycle, this creates a potential deadline issue for controllers working outside of the EMEA area, as the office hours in most APAC & AMER countries are not aligned with the office hours in EMEA.

Using the example above of a new product available in the North American market, the issue can be outlined in practical terms. If a user in the California sales office needs to input sales data for the new product on the last day of the reporting cycle, but does not have access to the product, they can create a support ticket. Due to the time difference between the sales office and the technical support staff there will be some delay before this ticket can be processed. In the best case scenario, the ticket will be processed the next business day in EMEA and the user will have access the following morning local time. In practice this means the user has lost a working day in the reporting timetable and was not able to meet the reporting deadline which may also contribute negatively to their opinion of the reporting platform. This example has been illustrated in Figure 4.

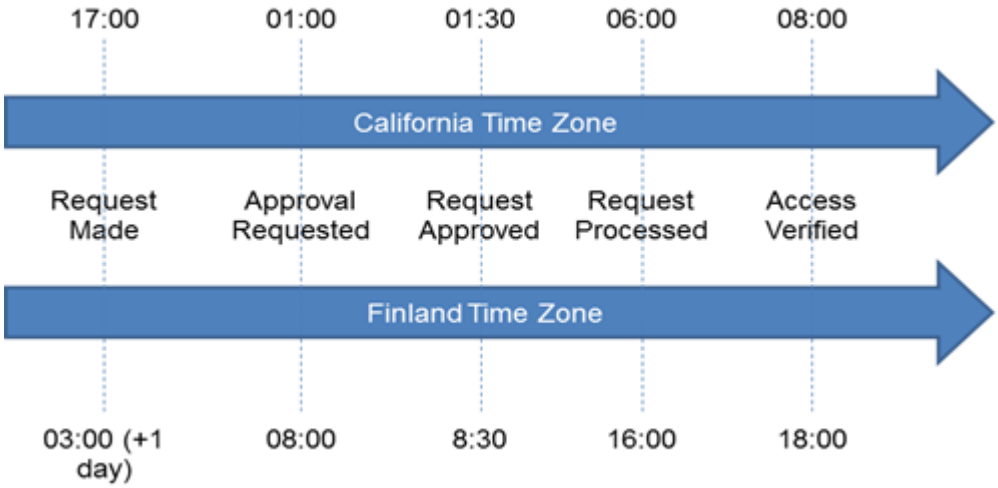

Figure 4. Support processing time

Even though the request was made and processed according to the principles and procedures outlined for the technical support staff, the technical support function did not support the user in their objective of completing the task within the normal reporting timeframe.

Ensuring the stability and reliability of the financial reporting system is essentially the goal of the system administrators. Whenever the reporting deadlines cannot be kept due to technical problems or inefficient support processes it is incumbent upon the ap-

plications administrators to remedy the problem and review their system and processes to avoid similar issues going forward. Any bottlenecks in the access management process are detrimental to the statutory reporting and management reporting processes as well as the company as a whole.

As illustrated in the example above, the access management process at Cargotec does not currently flow seamlessly and there are several elements in the process which do not serve the needs of the users in an optimal way.

1.3 Objective

The objective of this thesis is to review the access management processes currently implemented within Cargotec's statutory reporting and management reporting areas in order to analyze to what extent these processes follow the best practices within the field of operations management. Ultimately the access management process at Cargotec will be refined and or redesigned to ensure to all activities within the process serve to minimize the throughput time for each access request and provide value for the consumers of the process as well as the company as whole.

The overall throughput time for the Cargotec access management process will be analyzed to determine what is the current throughput time for an access request in the current process, what is the theoretical shortest throughput time for an access request in the current process. Then an analysis will be performed to determine what structures or mechanisms serve to create the gap between the theoretical throughput time and the actual throughput time. After this analysis has been completed, the access management process will be reviewed and refined with the goal of maximizing efficiency and minimizing throughput time by modifying the overall process workflow.

In addition to reviewing the access management process from a practical and procedural viewpoint, the other critical aspect of the Cargotec access management process to be reviewed is the overall customer satisfaction. Analysis will be performed to determine what are the expectations of the process, and to what extent does the process meets the expectations of the users as well as the company overall. When this analysis has been completed, the process will be reviewed and refined in order to ensure that as far as possible every structure and mechanism in the process serve to provide value for the users as well as the company overall.

The two key objectives of this thesis are to improve process efficiency and increase customer satisfaction. In order to determine the core drivers of throughput time and customer satisfaction for Cargotec's access management process, the process will be reviewed from a technical perspective as well as from an end user perspective. Once this feedback has been collected from the designated stakeholders within the process, practical steps will be outlined detailing what actions can be taken in order to create a more efficient process that supports the business in their core needs. Ultimately the goal of this thesis is to answer the following questions about the Cargotec access management process:

- What are the bottlenecks in the current process?
- What elements in the current process can be automated?

By improving the access management process both in terms of throughput time and customer satisfaction, the goal of the thesis is to create an enhanced solution that fully supports the system from a technical perspective, the end-user from a usability perspective, and the corporation from a strategic perspective.

1.4 Deliverables

Once the access management process for the statutory reporting and management reporting has been reviewed from a system perspective and its outputs considered from an end-user perspective, the thesis will outline key areas for improvement within the process.

Specifically the main deliverable of the thesis is a redesigned access management process. The redesigned process will include an overview of the new process itself including process inputs, process activities, and process outputs. The new process will also detail the process stakeholders, the process participants, any possible vulnerability in the process, and outline an approach for continuous process improvement.

The new process will focus on utilising mechanisms and procedures that support best practices within operations management. The new process will as far as possible automate tasks and focus on enhancing communication between different functions at Cargotec. Ultimately, the new process will be designed in such manner that internal

clarity is maximized as far possible in accordance the strategic targets outlined by Cargotec's management

Due to the complexity of the technical environment used for both statutory reporting and management reporting, the new process will be piloted only on one platform, the Hyperion Planning platform. While the process will only be piloted on one of the reporting platforms in use at Cargotec the principles outlined and solution proposed will take into account the complexity of the environment and ensure that the proposed processed can be scaled out on wider scale if the redefined process is chosen to be adopted at Cargotec.

The new access management process will be piloted on the management reporting application which focuses on the production demand forecasting, the Integrated Business Planning forecasting (IBP) process. Outputs from the Integrated Business Planning forecasting is used in the general management reporting application, but the scope of the applications is limited to two business areas (Hiab and Kalmar) and a subset of products from each business area. Limiting the pilot testing to this application will allow for a robust testing sample, but still limit the complexity by focusing on one technical platform.

2 Research Process

2.1 Overview

At the core of the thesis is the objective to determine if there are steps which can be taken to provide a more effective solution to the access management process used in the statutory reporting and management reporting at Cargotec. In order to gain a deeper understanding of the access management process in its current implementation research will be conducted to determine the structure of the current access management process.

The goal of the research on the current access management process is to understand the background and reasoning for the access management process and its various components as it is currently designed and implemented. The goals of this research on the current access management process is to identify the drivers of the access management process as well as clarifying the expectations of the process from both the end users, the technical support staff and well as the management overall. The results of research will be used to establish guidelines and principles which will serve as the framework for any subsequent process redesign.

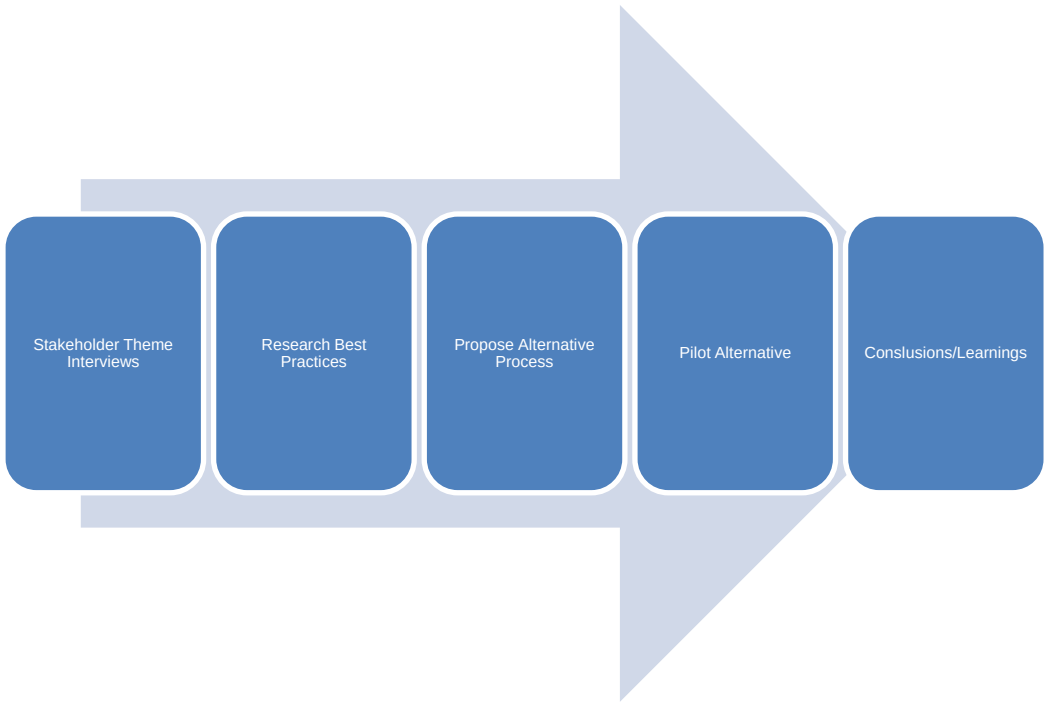

Figure 5. Research Process

The users of the access management process will be divided in to user groups for the purposes of this research: end-users and support staff. The end-users group is comprised of consumers of the process; they are the main customers and key stakeholders of the access management process. The support staff group is comprised of administrators of the process; they are charged with caring out the process and have practical experience in the various phases of the process.

The goal of the research is to determine if there are any components in the access management process which prohibit Cargotec from running their statutory reporting and management reporting at optimal efficiency. Ultimately the goal is to fully understand the requirements and expectations of the Cargotec access management process and from this understanding create a basis on which a new process can be designed.

2.2 End User Theme Interview

For the purposes of this thesis, the access management end-users group will be comprised of business area controllers as well as entity-level controllers. The end-user group will provide feedback on the access management process in terms of its utility for their daily work as well as for the needs of their business areas or entity. As the customers of the process, the end-users are best suited to provide feedback about how well the process functions in accordance with their expectations. The end-users will also be able to define or redefine the quality performance evaluators by which the process ought to be measured.

In order to collect feedback from the end-users groups, theme interviews will be conducted with management as well as non-managerial staff throughout Cargotec's controller community to get an overview of their initial opinions about the current access management process. Based on the outcome of the theme interviews, a customer satisfaction survey will be formulated to gauge process performance from a qualitative perspective.

The customer satisfaction survey will be carried out in two phases. The first phase will be conducted at the conclusion of the research process; the customer satisfaction survey will be distributed to the pilot group in order to assess their opinion of the current system. The second phase will be conducted once the redesigned process has been

formulated and piloted; the customer satisfaction survey will distributed to the pilot group again in order to assess their opinion of the redesigned access management process.

2.3 Support Staff Theme Interviews

For the purposes of this thesis, the access management support staff will be comprised of Hyperion system administrators who process the access management requests in the financial reporting systems from a technical perspective. The support staff is able to provide insight to the various process activities and phases of the access management process, furthermore the support staff is able to break down the overall throughput time of the process into distinct activities.

Feedback will be collected from the support staff via theme interviews. The primary participants in the theme interviews will be the non-managerial staff in order to ensure the process can be mapped in absolute and practical terms. Based on the outcome of the theme interviews a complete process map can be created indicating participants, resource requirements, and the approximate processing for each activity as well as the whole process.

At the conclusion of the theme interviews, the processing time for all access management requests will be collected for one monthly closing. The purpose of this data collection is to build a baseline which indicates the current access management processing time as whole as well as the processing time of each process component. This analysis will form a qualitative measure of performance, which can then be compared to the processing time of the new process to determine if there have been any substantial performance improvements.

3 Operations Management & Process Improvement

3.1 Business Processes: An Introduction

At a fundamental level, all work performed with in a company's organization should to some extent contribute to the overall company strategy and produce a product or service which in some way contributes to the financial performance of the company. The techniques and methods used to produce these products and services are defined within the context of a business process. Business processes exists in many forms and can be formal as well as informal, Waters defines a business process as follows, "all the operations that combine to make a product" (2006, p. 334).

Companies that manage their business processes and actively work towards improving and developing them will naturally have an advantage over companies that do not actively develop their process. According to a study conducted by the London School of Economics and the McKinsey Company, companies which develop and manage business processes as well as their corresponding technology deployments to suit their business showed a significantly higher return on investment than those companies which did not. Companies which invested minimal effort in developing their business process but had a high technological investment experienced a 2% return on their investment whereas companies which actively developed and managed their business process and had a high technological investment experienced an average of 20% gains in their return on investment (Conger, 2011, p. 3).

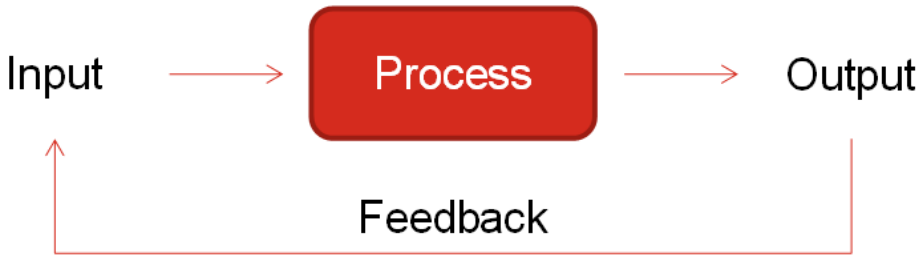

Figure 6. Business Process Overview (Conger, 2011, pp. 5-6)

Business processes development is an option for companies looking to improve overall performance, but in order to develop and improve business process it is necessary to understand their components. In the most abstract sense, business processes consist of three core components: inputs, process activities, outputs and process feedback, this is illustrated in Figure 6.

The starting point for a process can be described as its input or inputs, “inputs refer to any tangible or intangible items that flow into the process from the environment; they include raw material component parts, energy, data, and customers in need of service” (Anupindi, Chopra, Deshmukh, Mieghem & Zemel, 2006, p. 3). The business process inputs define help to the scope of the process by defining and limiting the data, information or material to be used in the process.

The ending point of a process can be described as its output or outputs, “Outputs are any tangible or intangible items that flow from the process back into the environment, such as finished products, processed information, material, energy, cash, or satisfied customers” (Anupindi et al., 2006, p. 3). The business process outputs help to define the consumers of the process, and the outputs are the items by which the overall utility of the process can is evaluated.

The transformation of inputs to outputs is done though an inter-related series of activities and buffers, which is in essence what comprises a process (Anupindi et al., 2006, p. 3). The process steps reflect how a particular business process was modelled and designed; it is the process steps which can be remodelled or reorganized to give overall process improvement. This network of activities and buffers can be modelled, modified and streamlined to achieve maximum performance efficiency and value.

At the conclusion of a business process there can be can iterative feedback loop. The feedback loop is represented in the form of monitoring and metrics performed on the outputs and their overall quality. The process feedback loop can be used to regulate and improve the overall process (Conger, 2011, pp. 5-6).

A business process exists to transform inputs into outputs for the sake of the process stakeholders and specifically for the sake of the process customer. The business process serves the needs and requirements of its customers and the customers accord-

ingly are able to affect how the process is formulated as well as the characteristics of the process outputs.

Process planning is the task of modelling the activities and buffers used to transform inputs to outputs in order to achieve an efficient and sustainable solution. Process planning is responsible for all the decisions within a process, and exists to outline how a product is produced. Ultimately the goal of process planning is to find the most efficient method to deliver a specific product to a customer. Process planning can be seen as a high-level strategic approach for how to create the desired outputs from the available inputs. Process planning is concerned with obtaining organization support for the process, aligning the process with corporate strategy, and ensuring resources are available to carry out the process. Whereas process planning is concerned with aligning the process with the overall company strategy, process design is focused on the operational implementation of a process (2006, pp.334-335).

Once the process planning phase has completed there are two outcomes:

1. A clearly defined business need for a process
2. A high level process design including the required outputs

With these two outcomes defined, the process can be implemented in practice, which is the process design phase. During this phase, process managers need to decide which architectural components need to be implemented to meet the mandated requirements and maximize customer satisfaction (Anupindi et al., 2006, pp. 12-13). Once the process architecture has been conceptualized the process manager needs to implement the process with the company's existing process matrix.

The business processes a company employs is referred to as its operations. Within the context of a company's operations the business processes can be classified into two categories. Processes that produce goods are known as production operations, processes that deliver services are known as service operations. Production operations are concerned with the creating tangible outputs. The outputs from production operations are easy to quantify; they can be an automobile at the end of an assembly line, an annual financial report prepared by a corporate communications function, etc. The output from service operations are often intangible and more difficult to understand and evaluate. The outputs from service operations can be a high level customer satisfaction

at the conclusion of a sales visit, worker morale after an incentive-based remuneration program is implemented, etc.

Regardless of whether the process is concerned with production operations or service operations, there are several different options and methods to create the required outputs. The different approaches which can be taken to convert the process inputs to process outputs can be designated as different process implementations. Every different process implementation has various benefits and downsides which differentiate it from the other options available, and each of these approaches will have different effects on the overall cost, scope and time of the process. Each of these three elements forms a constraint for the process and all are interrelated. The time constraint is the amount of time available for the process to produce the required outputs, the cost constraint is the amount of funding available for the process, and the scope constraint is that specifications of the process outputs. These three constraints are in conflict and modifying one may in effect modify the one or two of the others. For example, creating a more complicated output or requiring a higher quality output will in effect increase the scope of the process which may result in an increase in overall elapsed time and or an increase in the incurred costs. Similarly, a reduced timeframe for the process may result in increased costs and or reduced scope, and a limited budget may be compensated by increased time and or reduced scope.

As business processes are developed, the process manager is charged with the responsibility of managing these constraints and to evaluate the implementation options available for different processes. The goal of a process manager is to develop processes within production and service operations that are run as cost-effectively as possible (Anupindi et al., 2006, pp. 12-13). Therefore the process manager is responsible for constantly monitoring their business processes to ensure that maximum value is being created.

A large company operating on a global scale may have thousands of formal and informal business processes running. For the company is it is vital to understand what processes are running and to understand which processes affect what portion or of the organization. In order to understand a company's business processes and their interrelations it is important to consider how different types of processes can be classified and prioritized.

A company's operational activities can be divided into two subgroups: primary activities and support activities. Primary activities contribute to the design, production, sales and support of a company's products to its customers. Primary activities are the core business activities that generate revenue and facilitate growth. Support activities exist solely to provide inputs which support the company's primary activities. Support activities do not directly generate revenue but rather exist to make the operational activities more efficient and effective (Hill & Jones, 2007, pp. 83-88). The combination of primary and support activities comprises a company's value chain, which has been illustrated in Figure 7.

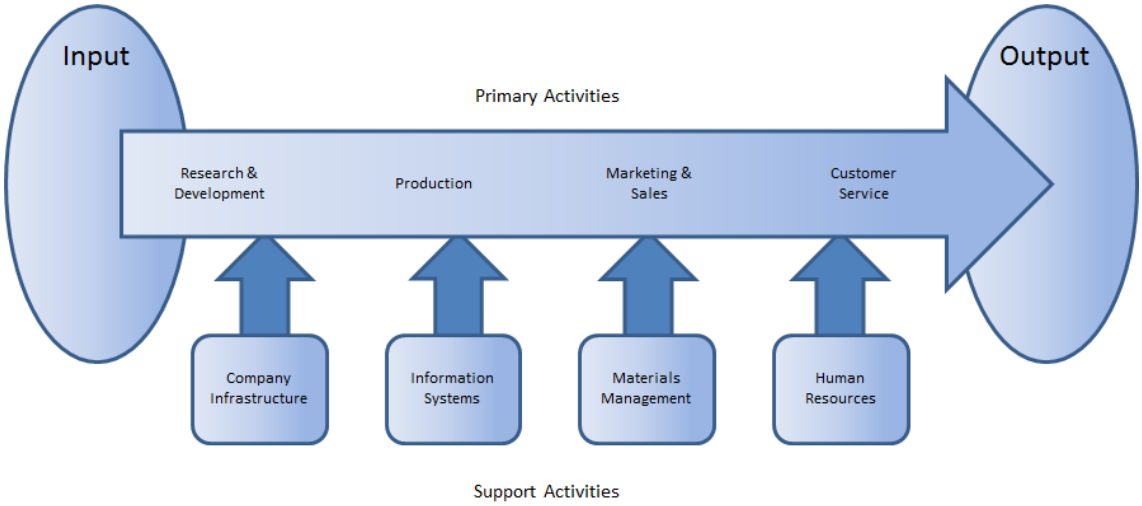

Figure 7. The value chain and its activities (Hill & Jones, 2007, pp. 83-88)

The value chain provides a simple overview of how a company's primary activities can be streamlined so that non-essential work can be moved to other areas of the organization so that functions carrying out the primary activities are able to focus their core tasks which serve to maximize company value. The business processed involved in support activities while not directly contributing to the company's revenue generation do provide inputs which allow the primary activities to run smoothly. However, if a support activity does not provide any value to the core business activities its viability needs to be reviewed.

Business processes are the assembled activities that enable a company to carry out its operations. All business processes start with inputs and transform them into outputs

which are valued and defined by the process customer. It is the role of the process manager to ensure the process is running efficiently and that the process continues to develop in accordance with the changing needs of the company and the process customer. In order to ensure the process runs in an optimal fashion and contribute to the company's core business activities, the process manager needs to constantly evaluate and analyse to what extent the process is fulfilling the needs of the customer and company overall. The next section will outline tools and methods are available to the process managers in this task.

3.2 Evaluating Processes

As was outlined the previous section, the output from a business process is the product or service which is created. Processes can be categorized as either primary or support activities whereby support processes provide value to an organization by enabling the core revenue-generating process to run effectively. Any superfluous resources allocated to a business process can be seen as waste because these company resources are not being efficiently utilised.

A process manager will strive to eliminate excess and unnecessary costs from their processes. In order for the process manager to succeed in this role, they first must understand the business process itself, what the process is attempting to provide for the customer and how this relates to the company's mission and vision. Conger writes, "Any process, process step or process product that does not contribute to the organization's mission, or its ability to meet its mission is waste" (2011, p. 4).

As processes are being evaluated and reviewed by the process manager, the goal for the process manager is to evaluate the overall process efficiency as well as effectiveness. Process efficiency is realized when the process minimizes process waste and curtails process costs. Process effectiveness however is attained when a process is implemented in such a manner that its activities contribute to revenue generation (Conger, 2011, p. 4). A business process is seen as efficient if the process is designed to operate a low cost, and a process is seen as effective if its outputs support the realization of the company's strategy.

The overall criteria for process effectiveness is whether or not there is a strategic fit among the following three components of a company's strategy: strategic position, process architecture and managerial policies (Anupindi et al., 2006, p. 23). The concept of strategic fit is a key question not only in terms of operations management but also in terms of the overall corporate strategy. By creating a consistency between the competitive advantages a company seeks through its strategy, the company's process architecture and the company's management philosophy there are tremendous possibilities to realize the strategic goals of the company through operational excellence. Focusing on process and process architectures that support the corporate strategy are paramount to the process manager in their constant analysis of the process under their control and autonomy.

There are several measures by which the operational performance of a business process can be measured. Four commonly used measures to gauge process performance are process cost, process flow time, process flexibility and process quality. Depending on the particular business process under review each of these measures will have different degrees of relevance and importance in terms of the strategic fit (Anupindi et al., 2006, pp. 12-13).

Process cost is a quantitative measure of business processes. Any business process will require resources to run; these can be in form of personnel working hours, investments in infrastructure, raw materials, etc. The process manager needs to track the costs which are incurred when running a process; both direct and indirect costs need to be considered. The costs for a business process need to be in line with the overall company budget and by extension the strategic goals of the company. If required, the process manager is able to evaluate alternative options to reduce process cost for example using alternative raw materials, or outsourcing a particular activity to a third party.

A second quantitative measure of a business process is the process flow time. Process flow time is the total time which elapses from the start of the process until the process output is ready for consumption by the process customer. To a greater extent than process cost, process flow time is a measure which is under control of the process manager. If required, the process manager is able to reorganize and work and workflows in

order to compensate for process bottlenecks and in general coordinate the process to ensure time requirements are met.

Process flexibility is a qualitative measure which can be used to evaluate business processes. Process flexibility indicates the degree to which the process can handle differing inputs and produce differing outputs. It is in interest of the process manager to model and develop processes which allow the process inputs to be modified and replaced, for example changing the raw materials used in the process. Similarly the process manager needs to ensure the process is flexible enough to modify the outputs so that the process can change and develop in accordance with the needs of the company to ensure the process is constantly contributing to the overall corporate strategy, mission and vision.

Process quality is another qualitative measure which can be used to evaluate business processes. Process quality indicates the degree to which the process produces outputs which are of sufficient quality according to the process specifications and the reliability of the process and its activities amongst other factors. Process quality gives an indication of how the process is viewed from the perspective of the process consumer as well as the process manager.

All four of these measures provide information about the operational performance of a business process. While process cost and process flow time are measures which can be evaluated and analysed in absolute terms, these measures need to be combined with the process flexibility and process quality to provide a complete understanding of a process's operational performance. For example, a business process might be designed so that is runs in an extremely cost-effective and streamlined manner, but the process would only be provide value if it is flexible enough to change with the developing needs of the company and provides an output of sufficient quality. The next section will examine the concept of quality as a measure of process performance in more details.

3.3 Product Quality and Process Quality

In the previous section measures were outlined which can used to evaluate whether or not a process runs in an efficient manner: process cost, process flow time, process

flexibility and process quality. By combining all four of these measures a complete picture of process efficiency can be outlined. This section will discuss the concept of quality and provide mechanisms and functions which can be used to evaluate the quality of service process outputs ands well as the quality of the process itself.

Quality is a concept which is used in many contexts but is difficult to define in absolute terms as it is a distinctly qualitative distinction. In terms of product quality, a product is seen as having superior quality if the combination of the product's attributes provides the customer with greater utility than the attributes of competing products. Quality is commonly evaluated in the context of two measures quality as excellence and quality as reliability (Hill & Jones, 2007, pp. 89-91). The concept of defining a product's quality as a function of excellence and reliability is presented in Figure 8.

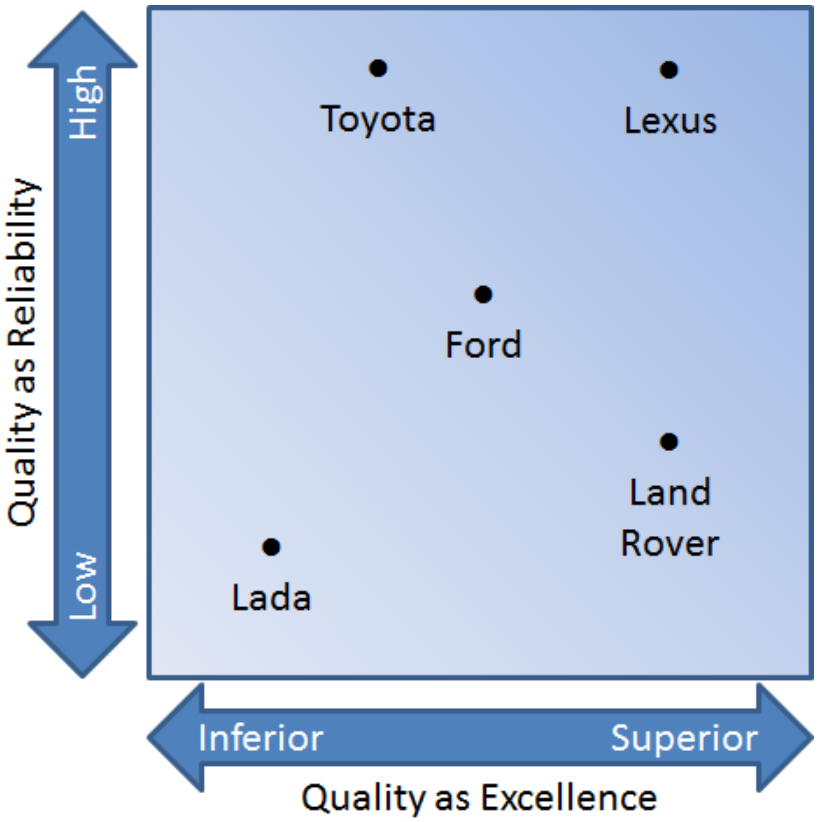

Figure 8. Quality as function of excellence and reliability (Hill & Jones, 2007, pp. 89-91)

While a tangible process output such as a car at the end of a factory's assembly line can be evaluated to determine if it meets the quality requirements which were specified in the project planning phase, intangible process outputs are not necessarily as easy to

evaluate. “Setting effective internal measures of performance for service operations is particularly difficult because services involve significant interaction with the customer and are often produced and consumed simultaneously” (Anupindi et al., 2006, p.12).

Using the example of a car manufacturer, it is relatively easy to determine the fuel consumption of particular model and compare that to other products offered on the market to evaluate its performance. However, it is significantly harder to determine customer satisfaction with the company’s customer service offering. Nonetheless, process outputs both tangible and intangible contribute to a company’s performance and need to be constantly evaluated and improved in order to stay relevant and viable. Waters argues, “An improved product can only give a temporary competitive advantage, as competitors will improve their own products to at least the same level. Now we can use the same argument for the process. Competitors are always improving their processes, so managers must look for continuous improvement to their operations to remain competitive” (2006, p.350).

A critical concept is that business process quality can only be measured if there as clear expectations of the process. Process quality must be defined in terms of conformance to requirements (Crosby, 1979, pp.14-17). Crosby argues the quality of a process output is only relevant in the context of how the process outputs are defined, accordingly a Lada can be seen as having as high quality as a Lexus as long as product conforms to the requirement definitions. Therefore, the process manager needs to understand what is required of the process outputs and ensure that the process quality is judged in the context of those requirements rather than some user’s abstract idea of quality. If the process manager is able to frame the evaluation of output quality in the terms of the process requirements in order to ensure there is a clear framework.

The process manager has as obligation to achieve the best possible process quality with the resources at their disposal. In essence this is achieved by ensuring that the process produces acceptable outputs while minimizing the need for multiple iterations. In order to achieve this task the process manager has three obligations: establish clear process requirements, ensure the process design supports the requirements, and constantly monitor the business process to ensure impediments are dealt with (Crosby, 1984, pp.59-60). Working in this manner will allow the process manager to model pro-

cesses which are designed to achieve the desired outputs, and enable quality improvement by producing quality outputs in the first iteration of the process.

Once the framework for the quality of process outputs have been defined and a process has been outlined which produces those outputs without superfluous work iterations, the next object in quality management for the process manager is to ensure the process maintains its current level of quality. In order to keep process running efficiently, constant attention must be paid to error prevention rather than quality assurance of finished outputs. Checking outputs to evaluate their quality is insufficient as these checks cannot do anything to improve the defect in the finished output. The only solution is to build processes which heavily use the concept of defect prevention and thereby eliminate the need for quality assurance. Crosby writes, “The error that does not exist cannot be missed” (1984, pp.66-67).

In the most abstract sense, quality is relative and elusory concept, the quality of an object depends on the attitudes and opinions of the person evaluating the object. The quality of process output however can be determined by outlining how well the outputs conform to the output requirements as defined in the process definition. A process can be seen as having high quality if it minimizes the need for multiples iterations of the same activities and utilises the mechanism of defect prevention rather than quality assurance. The next section will cover how process activities can be structured to ensure their activities and outputs serve the needs of the customer and restructured to maximize the overall process utility.

3.4 Value-Adding Activities and Service Processes

In the previous the concept of business process quality was introduced. The quality of process outputs it was shown can only be evaluated in context of the requirements and specifications provided for the process. Providing that the process outputs fulfil the requirements specified for the process outputs, they need to be seen as being of high quality. This section will explain how process activities can be evaluated and considered in the context of the overall company needs.

As was seen earlier, process outputs can be tangible as well as intangible and take the form of products as well as services. Intangible process outputs and especially those within a company’s service function such as Information Technology provide inputs

which allow the core revenue-generating processes to take place (Hill & Jones, 2007, p.85). While these processes do not directly generate any revenue, they are important to company operations to the extent that they provide inputs which enable the organization's core business processes to run. Accordingly, understanding the elements and characteristics of support processes is important because the processes are themselves only valuable to the extent that is facilitates other business functions. Through an objective analysis every activity in a support process can be evaluated in order to determine whether that particular activity is a value-adding activity or a non-value-adding activity. Value-adding activities are valued by the customer and thereby increase their economic value. Non-value-adding activities are required by a process but are valued by the customer and do not increase their economic value as a result. Ideally a process should minimize any non-value-adding activities and focus resources on the value-adding activities.

Value-added analysis is a process by which the activities within a process are outlined and categorized into four types: customer-facing, support, administration and other. Customer-facing activities are those for which a customer is willing to pay. Support and administrative activities are required for the process to run even though the customer may not want to fund these activities. In value-added analysis all other process activities are categorized as other as they are not a pertinent part of the business process required to produce the process outputs. Customer-facing, support and administration are all to some degree necessary to produce the process outputs and are therefore seen as primary processes. Other activities are not native to the process and therefore seen as secondary processes (Conger, 2011, pp.180-185).

The concept of how the activities within a business process can be defined as either value-adding activities or non-value-adding activities can be illustrated in the example of an automobile assembly line. The automobile assembly line is composed of many different activities which are organized and coordinated in order to produce a clearly defined output, an automobile. All of the process activities carried out in production of the automobile make up the production process. Certain of these process activities in the production process are valued by the customer; examples of this include attaching the doors to the chassis, mounting the engine, installing the windshield, etc. At the same time there are also other activities involved in the automobile's production process that are not valued by the customer, examples of this include redoing work which

has failed quality controls, time spent waiting time between activities, redundant work, etc.

The differentiation of process activities into value-adding activities and non-value-adding activities is critical for the process manager as it provides a method to help the process manager evaluate the process in terms of the utility provided to the process customers and by extension to the company overall. The process manager is able to optimize business processes from a customer perspective by directing process resources towards value-adding activities and eliminating non-value-adding activities. In so doing, a process manager is able to optimize the usage of resources available and does so in accordance with customer expectations.

The degree to which process activities provide value for the process customer can also be identified in service processes. Taking the example of a IT support service, in any given support case there are several distinct activities which are carried out by one or more persons and the end product of this process is the resolution of the technical issue. Every activity carried out in this process either increases the utility of the process for the customer or it does not. Examples of value-adding activities for this process include determining the cause of the support issue and eliminating the cause of the support issue. On the other hand examples of non-value-adding activities for this activity include time the support case spends in queue, internal communication during the process, handover between personnel, etc.

As in the case with the automobile assembly line, the service process can be streamlined to focus resources to value-adding activities while minimizing or ideally eliminating the non-value-adding activities. By adopting a customer-centric approach to service processes, the processes can be evaluated to ensure the allocation of resources is done in accordance with the customer's requirements and expectations.

Any resource spent on an activity that does not provide value to the customer is detrimental to the overall utility of a process. As such a process not only needs to produce goods of a sufficient quality, but also needs to do so in a manner which takes into account the needs and requirements of the customer. Having covered the areas of process quality and process value, the next section will outline quantitative methods for

examining process efficiency, specifically in terms of the amount of time elapsed from the start through the end of the process.

3.5 Process Flow Time

In the previous section, the idea of process value was introduced. A business process is only viable if its activities are configured in such a way that they provide benefit to the process customer and focus resources to areas that provide value to their organization. This section will cover how process activities can be analysed from an objective perspective; specifically how the time required to execute a business process can be outlined and measured.

A business process has been defined as a group of activities which are carried out in a specific manner in order to turn process inputs into process outputs. The process outputs can be tangible objects such as a finished product or they can be intangible objects such as a purchase agreement. Regardless of the output created during the process, the time which elapses from the start until the end of the process is a measure which can used to gauge the process performance. The amount of time it takes a business process to convert its inputs to outputs is referred to as the process flow time.

When reviewing the process flow time, the flow time can be broken down into flow time spent on each activity throughout the process:

$$\text{Process Flow Time} = \sum \textit{activity flow time}_x$$

The flow time for a process provides a foundation for quantitative analysis where process performance can be analysed over time as well as in relation to the flow time of other similar processes.

As discussed earlier, the activities within a business process can be defined as being either value-adding activities or on-value-adding activities. Similarly, the flow time which is associated with each activity within a process can be categorized as either value-adding flow time or non-value-adding flow time. The process flow time can be broken down into two components:

$$\text{Process Flow Time} = (\sum \text{value-adding flow time}_x) + (\sum \text{non-value-adding flow time}_x)$$

In order to make processes as effective as possible the process manager needs to, as far as possible, eliminate non-value-adding flow time. Process managers should strive

to make implement business processes which are devoid of non-value-adding activities, and the time such a process takes to run is defined as the theoretical flow time of the process (Anupindi et al., 2006, p.84).

One of the more common non-value adding activities is the time spent waiting between different process activities. In the same sense that activities can be broken into value-adding and non-value-adding activities, they can also be categorized as waiting time and activity time. By definition waiting time is non-value-adding, and does not contribute to the theoretical flow time. The theoretical flow time contains only activities that contribute to process utility from the customer's perspective. Every activity within the theoretical flow time is important to the end user and required to produce the output. The collection of these activities is also referred to as the critical path, and any activities on that path are referred to as critical activities (Anupindi et al., 2006, p.81).

As demonstrated, the theoretical flow time is the time a specific process takes to run its course without allocating any time to activities which are not valued by the customer. A process manager working to improve and develop business processes will need to align their process implementations as close as possible to the theoretical flow time. After doing so, the process manager will need to manage the components within the critical path for further efficiency gains. The next section outlines methods and techniques which can be employed to manage the process flow time and streamline process efficiency.

3.6 Process Optimization

The previous section outlined process flow time and defined how activities can be measured to determine the optimal amount of time a process needs to produce its outputs without spending time on secondary activities. This section will explain the options a process manager has at their disposal when working to increase process efficiency and minimize flow time.

The concept of theoretical flow time can be summarized as the total work content of the critical paths of a process. In order to improve the theoretical flow time for a process, the only alternative is to shorten the length of every critical path, as there is no unnec-

essary work included in the critical path. There are three basic approaches for how to achieve this:

1. Streamlining – Eliminating work content
2. Process Activity Scheduling – Execute critical activities in parallel
3. Product Output Management – Modify the outputs produced

These three alternatives are the main options available to process manager when reviewing how to improve process performance (Anupindi et al., 2006, p.87-89). Each of these approaches will be explained in the following sections.

3.6.1 Streamlining

Process streamlining consists of eliminating waste and thereby increasing efficiency. Typically business process streamlining entails removal of unnecessary administrative activities such as superfluous paperwork, approvals, etc. (Conger, 2011, pp. 226-227).

The simplest way to reduce the critical path for a business process is simply to reduce the work load for every critical activity within the process. This can be done via three different methods: eliminate any non-value-adding elements (work smarter), reduce work repetition (work more efficiently), increase the activity speed (work faster) (Anupindi et al., 2006, p.88-93).

Process managers are charged with the task of developing and maintaining processes, and the manager needs to understand what the core value-adding aspects of the process are. With this in mind, every critical activity within the process can be reviewed to determine if there are any superfluous components or elements which do not directly serve the interests of the customer or customers. Some examples of this type of superfluous work could include obtaining approvals, filing paperwork, etc. Any task within an activity that does not serve the needs of the user is a non-critical component and should be eliminated or moved away from the critical path.

In essence, the critical activities themselves need to streamlined, in additional to the overall process. This is necessary in order to ensure that all resources allocated to value-adding activities are truly serving the need and expectations of the customers. Once the critical path for a process has been determined, and non-critical activities have been addressed, any non-value-adding components have been eliminated, the process

manager will need to analyse the methods of working for further improvement of the performance of the critical path.

From a process design perspective, any time spent performing work on a critical activity is beneficial to the process overall as the work is required to produce the output. However, if the task carried out needs to be revisited or redone these additional iterations provide no additional value to the customers and thereby decrease the utility of the process.

In order to minimize the chances a task needs to be carried out multiple times, several approaches can be implemented depending on the type of process under review. The mechanisms to eliminate work content entail minimizing the effects of variables on a process (fool proofing), developing the ability and knowhow of the staff involved, as well as improving statistical oversight of the process.

In the case of the automobile assembly line the three principles used to eliminate work content can be seen in a practical terms. A well designed and implemented assembly line processed is configured to run according to a fixed schedule, with each iteration of a task being carried out identically without the need for analysis or deviation. Thereby, the process effectively removes any variables such as using multiple components for the same core automobile configuration or using different bolts or fasteners for the same work.

In the case of the automobile assembly line, the training of the staff can be seen as rudimentary when compared with other personnel, but basic knowledge will help them to ensure the tasks are carried out efficiently. The staff need to be instructed in how each tool at their disposal works, the techniques required how to do their tasks properly, etc. If the staff is not given this basic training, the risk that their tasks will not be executed properly will increased.

The concept of improved statistical oversight is especially relevant in the case of the automobile assembly line. Through statistical data analysis, the process manager will be able to determine if there are any bottlenecks in process as well as if the process can run at a higher flow rate. Also the process manager can analyse which stations

along the assembly line are performing poorly and prepare some actions to improve the performance.

Using the concepts of foolproofing, developing staff and increasing statistical oversight, the process manager can ensure their process contains activities which are being performed in the most efficient manner. Once a process manager has eliminated non-value-adding task components, and reviewed the working methods to ensure maximum efficiency, the remaining option is to configure the process and its activities to simply do the work faster.

Working faster is a simple solution to process flow time improvement. However any process development done in the interest of working faster still needs to fulfil the requirements of working efficiently and not creating any additional rework. Also important to consider is that in order to increase the speed at which an activity is performed there is generally a need for investments in new equipment, additional personnel, or incentives for faster work in order to achieve the desired goals. In the example of the automobile assembly line the number of units produced can be increased by running the process at a higher speed. However in order to achieve this, the process manager needs to ensure the equipment used in the activities can support the additional workload, and that the personnel can continue to perform their tasks without any degradation in the overall quality of the outputs.

3.6.2 Process Activity Scheduling

Reducing the work content of a process is one option available to a process owner when evaluating how the process can be run more efficiently. Another option the process manager has at their disposal is to consider is how the overall flow time of the process can be shortened.

As discussed previously, the activities within a process that contribute value to the user are known as the critical activities. The time a process needs to run its course is the sum of the critical paths plus any additional non-critical activities. The process owner can evaluate the order of the activities and move any activities that are not on the critical path and run them in parallel to the critical path. Essentially the goal is to have the start and end of the business process be as close as possible to the start and end of

the critical path. The process manager needs to analyse if any of these can be taken off the critical path and done in parallel with a non-critical path. This concept has been illustrated in Figure 9.

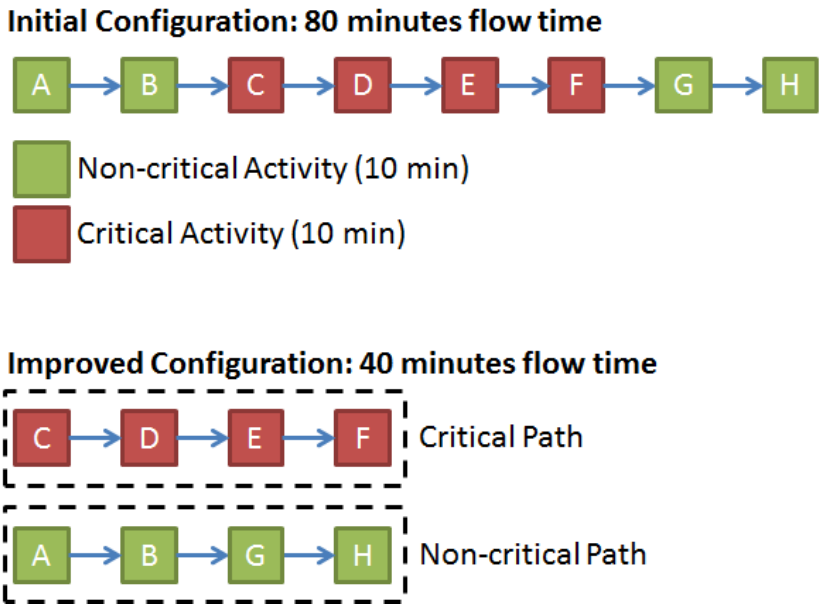

Figure 9: Managing Process Activities

Figure 4 demonstrates a business process consisting of 8 activities. Each activity requires 10 minutes to execute and is designated as either critical or non-critical. The process in its original configuration executes two activities, then runs the activities along the critical path consisting of 4 activities, and then finishes by running two additional activities. The result is that the process takes 80 minutes to execute as the 8 tasks are carried out sequentially.

Another approach to this process would be to start the critical path immediately at the start of the process, and at the same the activities along the non-critical can also be started. Both the critical and non-critical paths take 40 minutes to execute by running them entirely in parallel, the process flow time can be cut in half.

The concept of working in parallel is a useful tool for process managers and can improve the overall process flow time. However, limitations such as dependencies between activities determine the extent to which activities can be run in parallel.

3.6.3 Process Output Management

The third alternative available to a process manager interested in improving process flow time is to evaluate the products or services being produced. By understanding the outputs the process needs to deliver, the process manager is able to evaluate if alternative solutions or products can be used. If so, these alternatives products or services may have different process implementations and as a result varying flow times.

The process manager needs to understand the core needs of the process customer and what the requirements set for the process are. With this in mind, the process manager is able to propose alternative configurations for the process output which take less time to produce but provide the same utility to the customer as outline din the process requirements.

3.7 Conclusions: Applying Operations Management Best Practices

Business processes exists in every function within a company and the combined outputs of a company's business process are reflected the company's financial performance and strategy realisation. All business processes consist of inputs, activities and outputs which serve to support the company's value chain. This concept has been visualized in Figure 10.

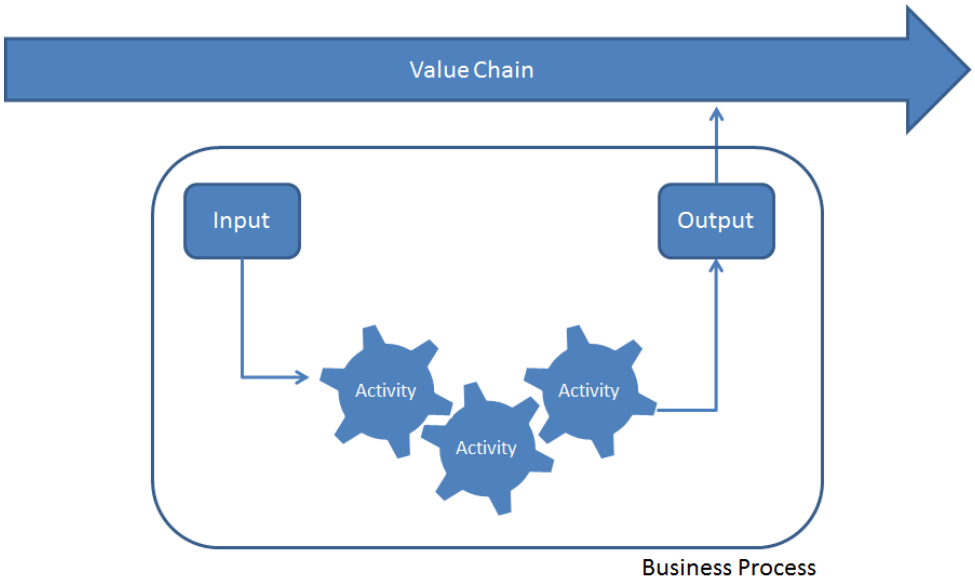

Figure 10. Business Processes and the Value Chain

As Cargotec's financial outlook and strategic targets develop in accordance with the market performance of its business areas, the business processes within Cargotec need to remain agile and able to adapt in order to ensure they fully support the organisation. If Cargotec changes its strategic focus or reorganizes its methods of working the business processes need to reflect the renewed company focus in order to remain beneficial to the company. By actively creating flexible and sustainable business processes and eliminating counter-productive work, Cargotec can achieve higher levels of efficiency in their overall operations. The core task of evaluating business process efficiency and developing operational efficiency is the goal of the process manager.

The overall efficiency of a process can be summarised in how well it is designed, how well is supports the business focus and how streamlined the process itself is, this is visualised in Figure 11.

Figure 11. Components of Business Process Efficiency and Effectiveness

Efficient business processes start with a clear vision of what is required from the process. By clearly outlining what types of outputs are required from the process, it is possible to evaluate the quality of the process outputs as well as the quality of the process activities.

The degree to which a business process is aligned with the company's overall strategic targets determines the effectiveness of the business process. By verifying alignment with the strategic targets, the process manager can ensure the process contributes to the company's value chain.

Even with clearly defined process outputs that reflect the company strategy and targets, the activities within a process need to provide value to the process customer. Value added analysis provides a mechanism for determining the extent to which process activities support the company. The process manager is responsible for continuous process development and ensuring that process activities are configured in such a way that they provide utility for the process customers and that the process is designed with the needs of its customers in mind.

The utility of Cargotec's access management process can be analysed via this conceptual framework. The extent to which these six criteria are fulfilled will provide an indication of how well the process is currently implemented and will at the same time outline which areas of the process can be refined in order to achieve overall process improvement.

Once the access management process at Cargotec has been analysed in the context of this conceptual framework, the core value of the business process will be understood from the perspective of all its stakeholders. Thereafter, the activities within the business process can be reviewed and analysed to determine whether or not they are running at a sufficient level of efficiency.

Business process efficiency is essentially a function of how well the process activities support the customer needs and utilize the optimal implementation options available. In order to gauge the efficiency of a business process activity, the process manager will need to evaluate to what extent it provides value and how streamlined the activity mechanisms are, this has been visualized in Figure 12.

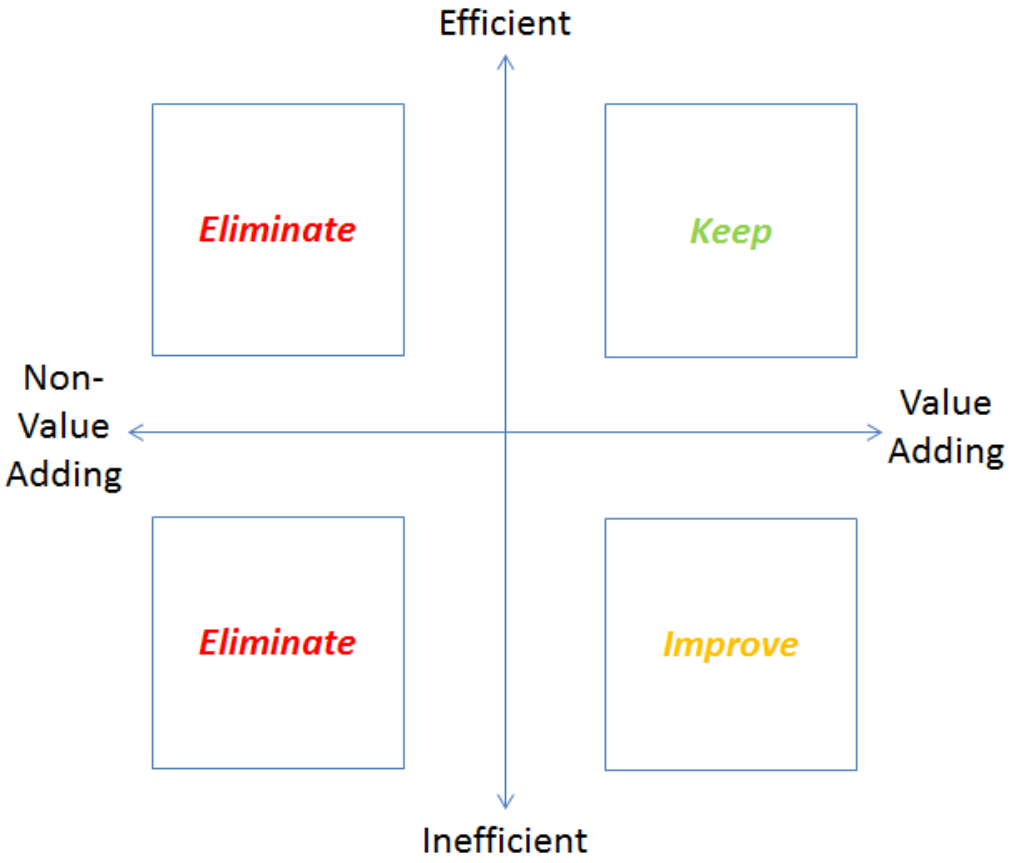

Figure 12. Process Activity Analysis

For every activity within a process that a process manager is responsible for, the process manager needs to determine the extent to which the process is supporting the business. An efficient, value-adding activity will be placed in the upper right quadrant of Figure 12. Inefficient, but value-adding activities will be placed in the lower right quadrant. All other activities are placed in the quadrants to the left. The process manager will need to improve value-adding capability by eliminating any non-value-adding activities and redesigning inefficient activities. It is the responsibility of the process manager to consistently monitor which process activities need improvement and which can be eliminated and develop their process accordingly.

In order to evaluate how to improve the access management process at Cargotec, the access management process will be deconstructed into its component activities. Each activity will be placed in one of these quadrants. The activities placed in the left quadrants will be reviewed to see if they can be eliminated or refactored, and activities in the

right quadrants will be kept, but particular attention will be placed on achieving performance optimization.

Process activity improvement is the cornerstone of a management philosophy committed to continuous improvement. The process manager that is empowered to develop processes in accordance with the needs of the business has the power to maximize the usage of resources at their disposal and enhance the contribution to the corporate value chain. A company that is aware of their business processes and is constantly working to improve them will stand to gain competitive advantage over companies that do not have a proactive approach to their business processes. The next section will apply the best practices from operations management as outlined in the conceptual framework to Cargotec's access management process. Through this analysis a thorough specification of Cargotec's access management process will be created, this specification will serve as the foundation for any subsequent process or activity redesign.

4 Current State & Need Analysis

4.1 Introduction

In order to examine the current access management process at Cargotec from as wide a perspective as possible, the three main user groups of the process were outlined: management, finance controllers, and the Hyperion technical support staff. In order to understand the process from each of these perspectives, theme interviews were carried out with each user group. The results of the theme interviews were a visualization of the current access management process, a clearly defined specification for the process outputs as well as general feedback about the process and its activities from the three key user groups.

The theme interviews with the Hyperion system administrators were held in order to outline the structure of the current access management process. The technical support staff is the user group which transforms a business need into a technical solution. In order to understand their work, the access management process was broken down into all of its component activities. Once the process had been broken down into different activities and mechanisms, the interdependencies could be specified and also each activity could be assigned to a specific user group. The theme interviews with the technical support staff provided the foundation for the redesigned access management process.

The theme interviews with the finance controllers served the purpose of establishing the current level of customer satisfaction and also provided an opportunity for the main process customers to provide feedback about the process overall. The finance controllers are the users whose daily activities and work performance are dependent on the access management process. If the access management process does not function or runs at an unreasonable pace, the finance controllers are group of users which are most significantly impacted.

The theme interviews with Cargotec management served the purpose of outlining the requirements of the process and defining what outputs the process needs to deliver. These theme interviews helped to define the value-adding activities of the process, as the finance management is ultimately the group within Cargotec that funds and supports the overall Hyperion platform.

4.2 Current Access Management Process

The financial reporting systems used at Cargotec are built on top of the Oracle Hyperion platform. The financial reporting systems organize Cargotec's operations into logical hierarchies which reflect the geographical and legal structure if the overall corporation. For reporting purposes the two main hierarchies used in financial analysis are the entity hierarchy and the products hierarchy. Based on the security settings assigned on these two hierarchies, a system user can be divided in one of three groups: entity-level user, division-level user, or a business area user.

Figure 13. Cargotec Access Management Overview

Most users of the reporting system belong to the entity level user group and are responsible for the data entered to a particular entity, which may have data entered

against one or more products in the reporting structure. In this case the user would be given write access to one entity and the products which are associated with that entity.

The second largest group of users in the reporting system belong to the division level user group. These users are responsible for the data which has been entered to a group of products by one of more entities. In this case the user would be given read access to all entities and read access to only one group of products.

The smallest group of users in the reporting system belong to the business area level user group and are responsible for all the data entered within a business area across all entities and products. In this case the user would be given read access to all entities and products applicable to their business area.

By limiting the system users to one of these groups the access to Cargotec's matrix organization can be maintained effectively. The security is somewhat complicated by the fact that users may have dual roles, serving as an entity controller for one entity and a division controller for a product division. In this case the user would need to have two user accounts (one for each role) otherwise the controller would have access to all entities and all products if these two roles were to be merged.

The Hyperion system administrators at Cargotec are charged with maintaining the security configurations for the financial reporting systems. The access management module for Hyperion products is not a standalone component and is not smoothly integrated into the overall Hyperion software suite. As such, the access management module requires the Hyperion system administrators to work with multiple modules of the Hyperion suite in order to process access requests. Due to the complexity of the access management in the Hyperion environment, the access management process currently implemented at Cargotec has not been significantly reviewed and or developed since the Hyperion system rollout at Cargotec.

Due to limitations in the architecture of the Hyperion components and the lack of a centralized mechanism for managing access requests, the access management process is a manual and labour intensive process. The process was implemented as an initial solution, but has not been developed or refined in accordance with the changing needs of the business and the financial reporting applications. The access management pro-

cess is currently managed by the support staff without significant automation towards the various components of the reporting system. As a result, every access request needs to be processed individually, and in order to process the request, the support staff needs to have sufficient understanding of the reporting system's components as well as the corporation's organization in terms of geographical layout as well as the legal structure of the various business areas.

The Cargotec access management process relies heavily on effective communication between the end-users and the support staff. While the access requests are managed primarily by the support staff, ownership of the request resides with the end-users which make the access request. This is due to the fact that while the request needs to be carried out by the support staff, only the end-users are able to confirm whether or not the access has been granted according to their requirements. The access request process expects all parties involved to have an understanding of the financial reporting structure (what to request), the financial reporting applications (where to request it), as well as the reporting timetable (when to request it). The support staff needs to be aware of the various deadlines pending for each user and user groups and prioritize the access request queue accordingly.

The access management process at Cargotec is designed to support the end-users in their monthly reporting tasks. The process, when functioning properly, should be seamless, intuitive and quick in order to allow the controllers to focus on their responsibilities within the reporting timetable. Ideally the users not should spend significant resources requesting system access and managing that access request's implementation to the system.

The access management process is initiated by the end users, driven by the Hyperion support staff and dependent on input from business area management. One of the targets of the process is that access requests are to be processed within 24 hours. The complete access management process has been represented in Figure 14.

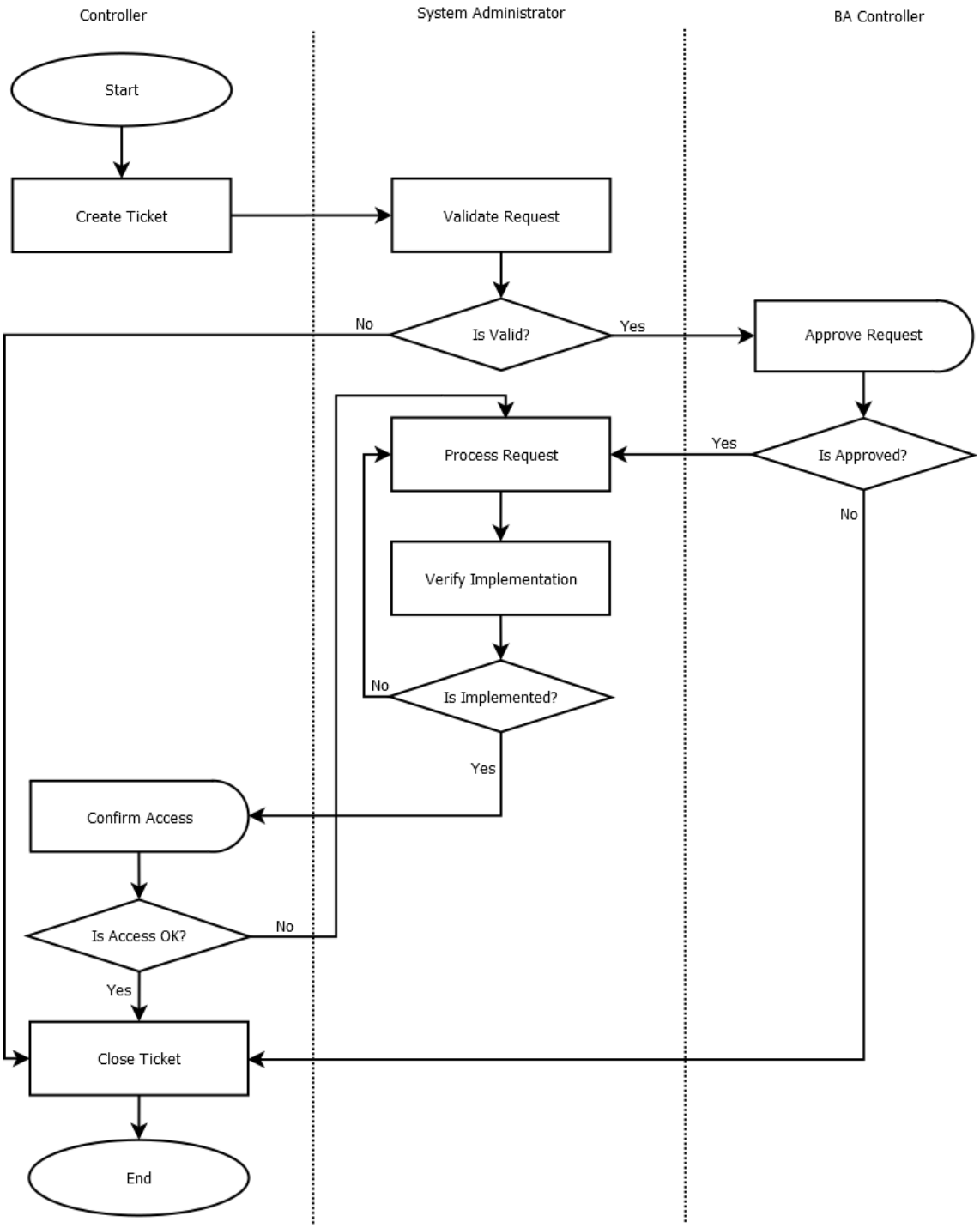

Figure 14. Current access management process

The general flow of the security request process can be outlined in the following steps:

1. <START> A Hyperion user creates an access request via the general IT support ticketing system
2. The IT support ticketing system assigns the case to the Hyperion support team
3. The Hyperion support team performs a sanity check on the request.

   a. If the request is invalid, i.e. invalid entity code, it is returned to requestor who can either provide more information or to close the ticket <END>
   b. If the request is valid it is assigned to a specific approver, i.e. business area controller
4. The approver reviews the request and makes a decision on whether or not to approve the request, and assigns the ticket to the Hyperion support team.
5. The Hyperion support team processes the request according to the approver's decision.
   a. If denied, the ticket is assigned to the requestor and closed <END>
   b. If approved, the access request is processed in the Hyperion system, and the ticket is assigned to requestor.
6. The Hyperion support team verifies the request has been implemented correctly
   a. If the access request has been implemented properly, the ticket is assigned to the requestor
   b. If the access request has not been implemented properly, the ticket goes back to step 5
7. The requestor verifies the access has been granted
   a. If the access is not OK, the ticket goes back to step 5
   b. If the access is OK, the requestor closes the ticket <END>

During the course of the theme interviews, the controlling community indicated that certain elements of the access request process need improvement in order to more completely serve their needs. The main takeaways from the theme interviews were the following:

1. It is not always clear to which Hyperion codes users should be requesting access.
2. There is no simple mechanism for the requestors to follow up on a request during the process.
3. The current process is designed to support the EMEA region, but does not adequately support the reporting units in the APAC and AMER regions
4. If the throughput time for the process can be improved, it would provide a benefit for the end-users as it would give them more time to work in the reporting cycle

After reviewing the process with the Hyperion support staff, the feedback was that while the process is functional overall, there a number of bottlenecks and elements which could be improved. The main takeaways from these theme interviews are the following:

1. The current security solution is overly complicated, which makes troubleshooting errors more difficult.
2. The auditing process can be streamlined made more efficient
3. There should be one access management interface for all Hyperion applications
4. As far as possible, the administration tasks need to be automated to eliminate the risk for human error.

As a result of theme interviews, the overall throughput time for an access request was selected as a measure which could be improved. The overall processing time was reviewed based on a number of access rights requests and two bottlenecks in the process were identified. Both of the bottlenecks are outside of the control support team, and are a matter of prioritizing or assigning tasks more efficiently.

The first bottleneck in the process is the time the ticket spends queuing for business area approval (step 4). Currently the ticket is assigned to one user via email and the process does not have any efficient mechanisms to follow up or to automatically reassign the ticket to another user if there is activity.

The second bottleneck in the process is the time the ticket spends queuing for confirmation from the requestor that the ticket has been properly implemented (step 7). At this stage of the process, the support team has implemented the request and is awaiting confirmation from the end-user that their access is correct. The process does not officially end until confirmation is received from the end user that the ticket has been resolved.

There are also several activities in the access management process which could be automated to improve the overall throughput time and quality of the process. The activities which could be automated are both in the request process itself as in the integration to the Hyperion environment.

The first activity which could be automated is the initial sanity check performed on the ticket by the Hyperion support staff (step 3). This activity could be improved to cross reference the request against the metadata in the Hyperion environment (correct codes, etc.), and eliminate the need for any manual work.

The second activity which could be automated is related to integration between the access request and the Hyperion reporting software itself. The access management process currently requires a system administrator to manually log the access request in the appropriate server component. A request may require changes to be done on up to three different security components in the Hyperion platform. Rather than doing the work manually as it is currently done, an automated solution which processes approved access requests to the relevant Hyperion components would serve to reduce throughput time and raise the overall integrity of the process.

4.3 Process Requirements

After conducting the theme interviews with each user group, the requirements of the process have been made clear. The primary requirements are to provide the framework to support Cargotec's external and management reporting processes. Secondary requirements of the process have also been outlined which indicate how the modified process can provide additional value to the organization.

The primary requirement for the access management process is to have a mechanism by which users are able to obtain access to the system which supports the corporate reporting timetable and all associated deadlines. The following aspects need to be incorporated into the final process:

- Each access request which is submitted through the process needs to be completed in a maximum of 24 hours
- The process needs to support auditing to enable the tracking of the request and approval flow
- The process needs to work across the entire Hyperion environment

The secondary requirement for the access management process is to have a process that gives value to the organization and contributes to overall corporate strategy. The following elements have been outlined as a part of the secondary requirement:

- The process should be simple and transparent
- The process should be intuitive and accessible
- The process should eliminate unnecessary work across all user groups
- The process should use automation to remove the element of human error from the implementation activities

4.4 Process Bottlenecks and Limitations

As the access management process has not been actively developed and improved since its implementation there are a number of shortcomings and limitations which detract from the overall utility provided to the company. These bottlenecks and limitations need to be addressed in order for the process to deliver its full potential and allow finance function to operate in optimal conditions.

The main bottlenecks in the process are the time the access request spends pending input from the business area controllers or from the finance controllers themselves. The access management process cannot run without relevant user input from both of these groups, but the time a ticket spends pending input is significant and outside the control of the process workflow itself.

For every access request made in the system there is a designated user or users that are authorized to approve this access. When a request is processed the ticket is on hold until a decision is made on whether or not to approve or reject the access request. This could be improved by either increasing the number of users that are able to make the decision or creating a simpler mechanism by which the approval decision can be made.

After the ticket has been implemented, the ticket remains open until the user confirms they have access to the requested data combination. This is necessary as for security reasons the support staff does not have access the login credentials of the requestor in order to verify that access has been granted properly. Once the user has been granted access to the reporting systems, they often do not have significant motivation to confirm that the request is completed. This makes the target of a 24 hour processing time difficult to achieve, and skews the overall performance analysis of the access management process.

The other limitations of the process are the amount of manual work required by the technical support staff to correctly process the access requests. For example, the initial sanity check performed by the support staff could be automated and handled via a more sophisticated user interface when the initial request is made. Also the integration to various components on the Hyperion platform could be done programmatically to reduce the number of man hours spent processing security.

4.5 Current Process Efficiency & Effectiveness

The efficiency and effectiveness of the current access management process can be estimated in the context of the six components of business process efficiency and effectiveness outlined earlier: clear output requirements, output and process quality, process alignment with strategy, value added analysis, continuous development and customer focus.

The access management process has clearly defined process requirements, all access request are to be processed within 24 hours, support auditing to enable tracking of which users have requested and approved a request as well as supporting both the external as well as the internal reporting platforms.

The quality of the process outputs and the process activities need improvement. Currently there is no mechanism within the process activities to identify implementation issues and rather the process relies on the users themselves to verify their access has been processed correctly and if issues exist, the process needs to start again. Also the quality of the process activities has room for improvement with a low degree of process activity automation.

The access management process is well aligned with the overall strategic goals Cargotec has set forth of improving internal clarity and supporting faster decision making. While the access management process is a supporting process it still plays a major role in allowing the flow of financial information to the persons responsible for making decisions related to strategy implementation.

The access management process has some room for improvement in terms of maximizing the value-added work the process provides. The process activities concerned with

approvals, handover time, queue time and testing can all be redesigned to eliminate those tasks, run them in parallel with other activities or automate their implementations.

The access management process has not been actively developed and improved since its implementation which has led to the process being comprised of a series of disjointed and separate activities. In order to improve and stay relevant to process needs to have continuous reviews and requires a proactive approach from the process manager to ensure sustained performance.

Finally the access management process needs to be completely redefined in terms of its goals. Currently the process aims to handle access requests as quickly as possible and has a focus on what need to be done technically to achieve the results. The technical implementation needs to be seen as incidental with the real focus of the process being on the customers. In accordance with the changing business environment and fluctuations in Cargotec's strategic focus areas, the technical solution in the access management process needs to be designed in such a way that is flexible and can be adapted accordingly.

The current access management process at Cargotec allows the users to have access to the financial reporting systems. However, the process does not run in the most optimal way and requires significant resources from the end users as well as the support staff in order to function properly. The current access management process is designed in such way that a significant increase in the complexity of the environment (more application, more hierarchies, etc.) would render the access management process extremely cumbersome to maintain. Also, the current access management process does not take the changing needs and requirements of the process customers into account. The process is built simply to process access requests but does not provide significant opportunities for the users to provide feedback about their user experience and is not actively developed.

A redesigned access management process would allow the finance function at Cargotec to spend more time on their core tasks. Furthermore a more robust process, which reduces manual work, utilizes automation and improves communication channels will ensure Cargotec is able to scale up the usage of the Hyperion environment without

having to consider the ramifications on the access management process if the need should arise.

5 New Proposal

5.1 New Process Overview

In the previous sections, the access management process used for the financial reporting systems at Cargotec has been identified as a potential candidate for optimization and redesign. The shortcomings of the access management process have been outlined in the previous sections where the bottlenecks and overall vulnerabilities of the process were outlined in details. In this section a new approach to the access management process will be outlined and explained.

At its core, the current access management process is in place to support business critical activities which allow for the monitoring and follow up of financial and operational performance targets. As seen in previous sections, the current process doesn't fully support the needs of the business and is at times is too rigid. The new proposal will as far as possible strive to eliminate handovers, human errors and as a result make the process seamless, transparent and flexible.

5.2 New Process: Key Roles and Activities

The new process which is being proposed to handle the access management requests is based on the current process. The major deviation from the current process is that the role of the system administrator has been removed.

Essentially all tasks which were previously charged to the system administrator have been automated. The principle behind this approach is to progress from the current technical implementation which relies heavily of manual work and requires a technical expert to convert access requests to system implementations. By reviewing the ways of working within the system administration team and using more sophisticated interfaces to the Hyperion reporting environment, the access request processing time could be reduced dramatically and essentially be a non-factor in overall access request processing time.

After removing the limitations caused by requiring access requests to be processed by the system administrators, any delays or bottlenecks in the new process will be a func-

tion of the activities of the remaining users in the process, the requestor and the approver.

In order to achieve this functionality, an access management tool will be implemented. The purpose of the tool is twofold. First the tool will provide a structured and stable mechanism to create and track access management tickets. Second the tool will handle necessary communication within the process (informing & reminders approvers of pending requests, process requests to the financial reporting applications, etc.)

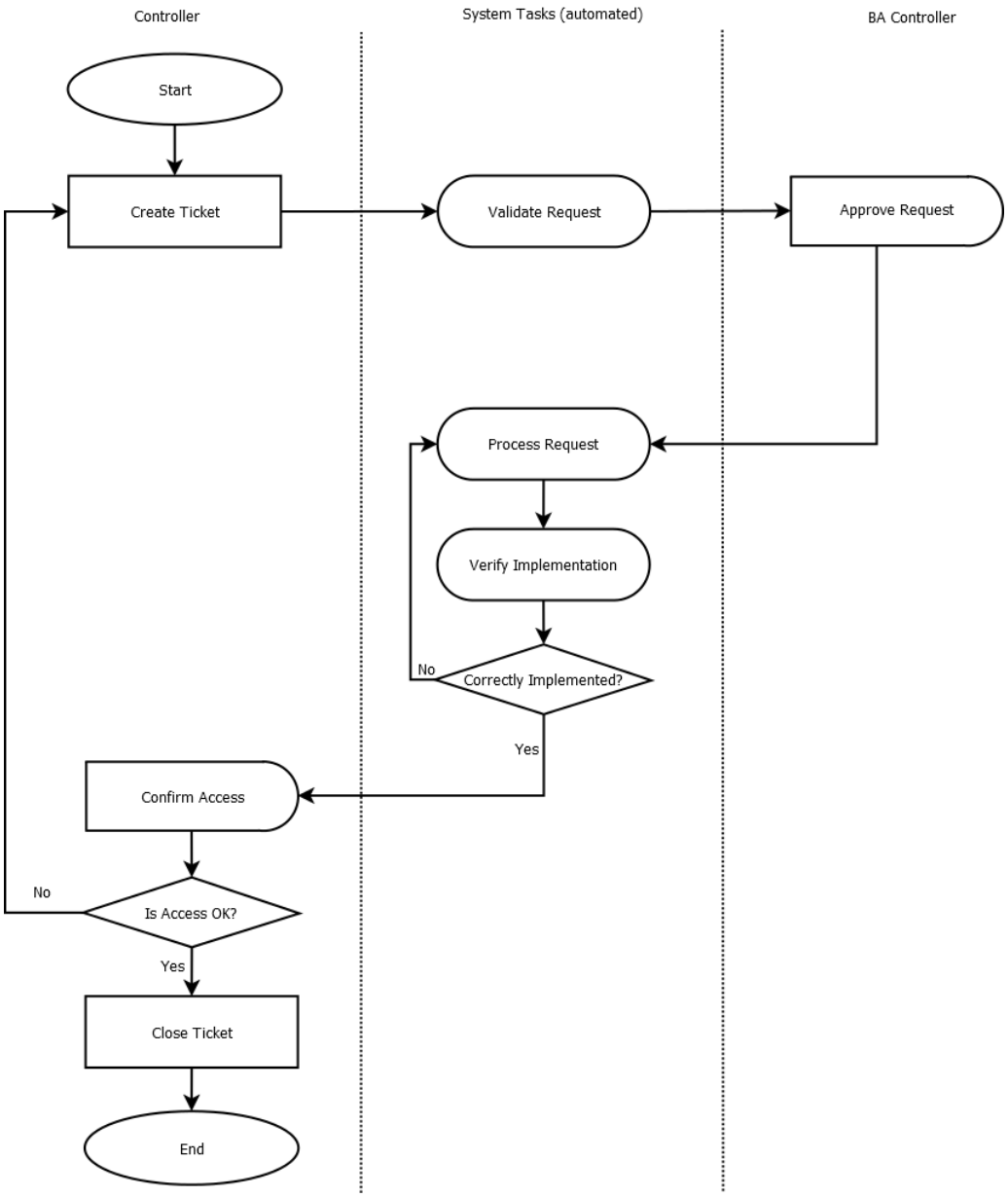

Figure 15. Proposed new access management process

The general flow of the new access request process can be outlined in the following steps:

1. <START> A Hyperion user creates an access request via the access management tool
2. The access management tool performs a sanity check on the request.
    a. If the request is invalid, the ticket is not created <END>
    b. If the request is valid it is assigned to a specific approver and an email is sent to the user, i.e. a regional or business area controller
3. The approver logs into the access management tool reviews the request and makes a decision on whether or not to approve the request, and notes there decision in the tool
4. The access management tool processes the request according to the approval status.
    a. If denied, the ticket is assigned to the requestor and an email is sent informing the user
    b. If approved, the access request is processed in the Hyperion system, the ticket is assigned to requestor and an email is sent informing the user.
5. The requestor has an opportunity to verify the access has been granted or to review why a request has been rejected
    a. If the access is not OK or if the user believes their access was erroneously denied, the ticket goes back to step 1
    b. Otherwise the requestor closes the ticket <END>

5.3 New Workflow: Ownership

While reviewing the access management process and collecting feedback about its viability, several shortcomings became evident. One of the main issues with the process was a lack of ownership throughout the lifecycle of an access request.

The primary reason for this lack of ownership can be explained by the fact that there are three distinct groups of people involved in the process. Each set of users performs a distinct task and there is little to no overlap between the users. As a result, each user group performs distinct tasks (creating an access request, approving an access request, implementing an access request), without having an insight into the previous or

subsequent stages of the process. These activities are executed independently of each other with each group only having responsibility for their part of the process.

Whereas in the current process each user group is responsible for some phase of the process there is not a clear owner of the access request from start to finish as each group is only working on their section of the process. One of the core concepts of the new process is to put ownership and responsibility of the access request in the hands of the end users, specifically the requestor.

The users making the request will have visibility throughout the entire access request process. As a result, if any delays occur the requestor will be empowered to address any elements which are impeding the progress of the access management request.

5.4 New Process: Role of the System Administrator

The overall workflow in the new process is quite simple. As the new process relies heavily on the automation of manual tasks, the workflow is more or less limited to the requestor and the approver.

The requestor initiates the process and the approver drives the process. As long as the process functions as designed there is no role which the system administrator needs to be involved in during the course of an access management request. However, the system administrators are responsible for the upkeep and stability of the access management tool.

The system administrators are required to ensure the tool is running as designed and is aligned with the Hyperion servers. This task can be categorized into three types of activities:

1. Keeping the access management tool aligned with Cargotec reporting requirements
2. Keeping the access management tool aligned with Hyperion reporting environment
3. General system maintenance & development

These maintenance activities are to be carried out in accordance with the regular reporting timetable to ensure the access management tool is available at all times during the critical reporting periods.

The first task system administrators need to mind when working with the access management tool is to ensure the tool is aligned with the current Cargotec reporting environment. In practice this means that any Hyperion application to which users may need to create an access request needs to be available in the tool. Accordingly as new applications as are created in the Hyperion environment, they will need to be made available in the tool as well. Furthermore as the reporting applications are developed, any development items which have an impact on the security configurations need to be included in the tool as well. In practice this means as new entities or products are created and removed in the reporting application, this will need to be reflected in access management tool as well.

The second task system administrators need to mind when working with the access management tool is to ensure the tool is aligned with the current Hyperion reporting environment. As system patches are applied to the environment, the system administrators need to ensure the tool is still compatible and the interfaces to the Hyperion environment function as intended. Ensuring the stability of the access management tool is the sole responsibility of the Hyperion system administrators, and needs to be carried prior to the core reporting periods when the system needs to be in use.

The third task system administrators need to mind when working with the access management tool is coordinate the general system maintenance and development. The administrators will be responsible for collecting development requirements from the end users as well as ensuring access management tool's components are maintained in accordance with sound database & application tuning settings.

5.5 New Process: Access Management Tool

The core of the new access management process at Cargotec is the access management tool. The access management is intended to eliminate a substantial workload currently carried out by the technical support staff, and give ownership of the access requests to the business users.

The access management tool consists of three components:

1. A database repository
2. A basic user interface
3. A series of interfaces to the various Hyperion servers and web services

Each of these components is custom built for the purposes of this thesis and uses the Microsoft .NET framework as the Hyperion environment at Cargotec is running on top of Windows components. The solution is represented in Figure 16.

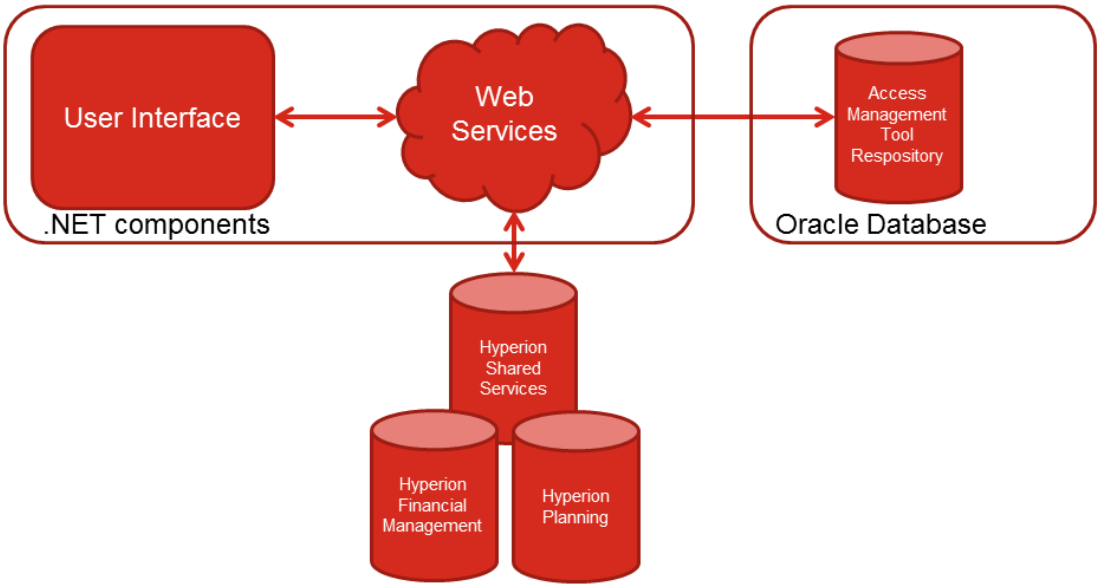

Figure 16. Access Management Tool

The access management tool requires a web server to host the web services, and a database server to host the repository. Both of these components require very little system resources and can use already existing web servers and database servers in Cargotec's technical environment.

No changes to the Hyperion components are required as part of the access management tool implementation. Currently each of the Hyperion components has their own configuration and mechanism to transfer security data to and from the server environment. As each Hyperion component is handled independently of the other, they have their own interface options and requirements. The web services will be customized accordingly to support the requirements of each Hyperion component, i.e. using SDK

functionality in the case of Hyperion Financial Management, transferring XML files in the case of the Hyperion Shared Services, transferring text files in the case of Hyperion Planning.

As the access management tool is taken into use, the long term stability of the solution will need to be reviewed and if required, the use of the Hyperion Software Development Kit and other Hyperion Java components can be expanded.

5.6 New Process Efficiency & Effectiveness

The efficiency and effectiveness of the redesigned access management process can be estimated in the context of the same six components of business process efficiency and effectiveness which were applied to the current access management process. The components to be analysed are: clear output requirements, output and process quality, process alignment with strategy, value added analysis, continuous development and customer focus.

The new access management process has the same process requirements as the current process and these have been clearly defined. All access request are to be processed within 24 hours, support auditing to enable tracking of which users have requested and approved a request as well as supporting both the external as well as the internal reporting platforms.

In the new access management process, the quality of the process outputs and the process activities have been given priority. The new process uses automated verification throughout the request implementation in order to identify issues as early as possible and address them accordingly to ensure the process outputs are of a high quality. Also the process activities have been automated as far possible to ensure and waiting time during and between process activities has been minimized.

The new access management process is well aligned with the overall strategic goals Cargotec has set forth of improving internal clarity and supporting faster decision making.

The activities in the new access management process have been reviewed to maximize their value adding aspects. The process activities which are concerned with approvals, handover time, queue time and testing have been redesigned to eliminate those tasks, run them in parallel with other activities or automate their implementations.

The new access management process is based on having a dedicated resource which is responsible for developing and maintaining the process. The process manager is responsible for continuously reviewing the process alignment with corporate strategy and actively working with the process customers to ensure the process continues to provide value and benefits for the customer.

Finally the new access management process has been reframed in order focus all of its resources and activities towards serving customer needs. The technical implementation of the process has been suited to serve the needs of the customers and to enhance the utility provided to them.

5.7 New Process: Summary

The access management process at Cargotec has been redesigned to address the limitations in the former process whereby the handling of access right requests was limited to the office hours of the support staff located in Northern Europe.

The initial steps in the access request process have been systematized and put within the framework of a .NET-based application. As a result of the requests being programmatically processed through the access request tool, potential errors and deficiencies in the process outputs will be identified earlier in the process and addressed before the outputs are delivered to the customer. For example, the systemization of the access request tasks will allow for faster feedback concerning whether or not a request has been made correctly (i.e. all required fields submitted, the requests reflects the current system codes, etc.) rather than relying on the users to provide feedback on the status of the request after it has been fully processed.

The administration activities within the access management process have also been formalized and put within the framework of a .NET-based application. This allows the requests to be implemented to the Hyperion environment without administrator in-

volvement and dramatically increases the efficiency of the process by removing the risk of human error and eliminating time spent in queues.

The overall ownership of access right requests has been allocated to the end users making the access request. The idea behind allocating the ownership to the end users is to involve the end users in the access management process and allow them to follow up on how the request is proceeding and empower them to drive the requests in accordance with their own time requirements.

The new access management process will serve to support Cargotec is its strategic targets and do so in a manner that is congruous with best practices from the field of operation management. Ultimately the success of the new access management process depends on the extent to which the process manager is involved in its development and how well the manager is able to develop the process in accordance with the changing needs of the customers.

6 Piloting

6.1 Proposed Pilot Scope

In order to review the feasibility of the new process, the redesigned process was intended to be piloted on a limited scope of users and Hyperion components.

During the piloting phase it was critical to not implement any solutions which would prohibit the former process from being implemented in the case that the new process does not work as designed. Furthermore, the new process was to be piloted primarily from a technical perspective which particular attention being paid to how to access management tool performs in terms of system performance to what extent the requests as processed properly to the various Hyperion components.

The system was to be taken into use for requesting access rights for the March 2013 reporting round. The pilot phase was planned to be carried out March 18th, 2013 through March 31st, 2013.

6.2 Issues with Piloting

At the start of the thesis research there was an understanding that the access management process needed to support both Hyperion Planning as well as Hyperion Financial Management. In order to demonstrate the new access management process, the access management application was built in accordance with the Hyperion Planning platform.

However, in March 2013, the Cargotec Hyperion environment was reshaped in accordance with a shift in the long terms plans for the financial reporting platform. The Hyperion Planning platform is to be discontinued at Cargotec and instead Cargotec's management reporting will be transitioned to Hyperion Financial Management.

As such, the application which was developed to support the new process could not be piloted as it was designed to work with Hyperion Planning. The access management application will need various modifications to its core structure in order to fully support the Hyperion Financial Management platform.

At the core of the redesigned access management process are the components and functionalities which are facilitated and provided via the custom built access management application. Any piloting of the new access management process is not possible without the access management application as the automated technical tasks would still need to be carried out manually by the technical support staff and the efficiency gains promised by the new process could not be realized.

As a result the piloting phase was not carried out and the new process could not be tested during the scope of the thesis.

7 Conclusions

7.1 Project Outcome

The objective of the thesis was to review the business processes which support the access management for Cargotec's statutory reporting and management reporting systems. An analysis of this business process and its components as well an estimation of how well the business process follows the best practices within the field of operations management was to serve as the basis for a redesigned access management process.

The access management process at Cargotec was found to be inefficient with a heavy reliance on manual tasks. The process did not have an owner from start to finish and the process activities were separated and carried out in silos. Furthermore, the process did not have a clear focus on the customer and was rather designed from a technical perspective. Due to the lack of a customer-centric design the process did not ensure that all of its activities provided value to the process customer and the overall customer satisfaction showed room for improvement.

After conducting meetings with the representatives from Cargotec's finance functions, the actual requirements of the process were outlined in details. Each access request needs to be completed in a maximum of 24 hours, request and approval auditing functionality is required and the process needs to work across the entire Hyperion environment. These core requirements served as the foundation for the redesigned access management process.

With the requirements in mind the existing access management process was reviewed to determine to what extent it was aligned with the principles of process effectiveness and efficiency which guide business process design and modelling. This analysis led to a redesigned process which focuses on the process customer and is designed to fulfil all the requirements while doing so in in a manner that maximizes the value for the customer.

The redesigned process relies on a custom-built application which handles the requests throughout their entire lifecycle from request to implementation. The application will eliminate the manual tasks currently performed by the technical support staff and put the ownership of the access requests in the hands of the business users allowing

them to follow up on and expedite the processing time for their access requests themselves.

During the course of the thesis, Cargotec proposed a shift in their strategy as related to their reporting systems. The current reporting platform which uses Hyperion Financial Management for external reporting and Hyperion Planning for management reporting will be simplified. In the future both external reporting and management reporting will be based on the Hyperion Financial Management platform and the Hyperion Planning platform will be phased out. Unfortunately this strategy was not clear at the outset of the thesis and piloting for the thesis which had primarily been focused on Hyperion Planning was no longer relevant to the long term strategy for Cargotec.

The access management tool which was built to support the new access management process is still relevant but needs some development to account for the fact the initial implementation will be in Hyperion Financial Management rather than in Hyperion Planning.

7.2 Next Steps

The redesigned access management process has been outlined and the participants have been identified. All tasks and interactions defined in the process are still relevant even though the scope of target platform has been changed.

The application used in the access management process will need to be reviewed to account for differences in the two reporting systems. Furthermore the following items should be reviewed in order to ensure the access management process performs in an optimal manner: the user authentication process and the application user interface.

Currently the Hyperion environment uses local user accounts which are unique to the Hyperion system and are not associated to the general authentication system implemented at Cargotec. Building an interface to the Hyperion authentication module is technically possible but a more robust solution would be redesign the Hyperion security to utilize Cargotec's centralized authentication mechanism, Active Directory, to authenticate the users and then simply handle the authorization tasks in the Hyperion environment.

The access management tool which was built for this thesis is a Windows-based application which uses web services to access the database repository and the Hyperion interfaces. In the future, when the application is released to a wider audience the user interface should be in a web application. This would ensure that all users need to access the tool is an internet connection and access to Cargotec's intranet where the web application would be available.

7.3 Recommendations

After reviewing the current access management process at Cargotec and comparing the process to the best practices and techniques used when developing business processes, a new approach to access management is suggested.

If Cargotec chooses to implement the access management process outlined in this thesis, Cargotec can be assured the requirements outlined for the Hyperion access management process will be achieved. At the same time, the proposed process will run in a more effective and efficient manner and focus on delivering value throughout all its activities.

At the same time, the new process is a proposal based on the current requirements of the business and the current implementation of the reporting system. In order to function over a longer period of time the new process needs to have a process manager designated who can oversee the day to day operations of the process and also manage the stakeholder expectations. The process manager will need to ensure the process is developed and modified in accordance with the changing needs of its customer base and that the process remains aligned with and actively supports Cargotec's vision and strategic goals.

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Theme Interview with System Administrators

Date: October 2, 2012 15:30-16:30

Participants: Niklas Magnusson
Kaspars Kalnins, Hyperion System Administrator
Aurika Skackova, Hyperion System Administrator
Ksenija Kaminska, Hyperion System Administrator

1. Would be beneficial to stop using local users and use Cargotec Active Directory instead
2. Requests are rarely filled in correctly
3. The current process is not intuitive, hard for new system administrators to learn
4. The current security solution is overly complicated, which makes troubleshooting errors difficult
5. The auditing process can be streamlined made more efficient
6. There should be one access management interface for all Hyperion applications
7. The process should eliminate unnecessary work
8. The process should use automation to remove the element of human error from the implementation activities

Theme Interview with Finance Controllers

Date: November 2, 2012 9:00-10:00

Participants: Niklas Magnusson
Katri Mehtala, Controller MacGregor Business Area

1. Current access management process is unclear
2. People do not know what to request, where to send the request
3. Requests are often processed incorrectly
4. Need to have a quicker solution
5. Current solution involves submitting an Excel request, but this is rarely filled in properly
6. It is not always clear to which Hyperion codes users should be requesting access
7. There is no simple mechanism for the requestors to follow up on a request during the process.
8. The current process is designed to support the EMEA region, but does not adequately support the reporting units in the APAC and AMER regions
9. If the throughput time for the process can be improved, it would provide a benefit for the end-users as it would give them more time to work in the reporting cycle
10. The process should be simple and transparent
11. The process should be intuitive and accessible
12. The process should eliminate unnecessary work
13. The process should use automation to remove the element of human error from the implementation activities

Theme Interview with Management

Date: October 5, 2012 9:30-10:30

Participants: Niklas Magnusson
Petri Rantanen, Senior Manager, CPM, Business Control
Petri Jokinen, Hyperion Financial Management Specialist

1. Current access management process seems to work for the most part
2. In the access management process, HFM and Planning both need to be supported and use the same access management process
3. The access management process should be seamless
4. Access requests should have the possibility for an audit trail, who requested, who approved, etc.
5. The access management process needs to have a higher level of quality both in the requests and in the processing phase
6. Each access request which is submitted through the process needs to be completed in a maximum of 24 hours
7. The process needs to work across the entire Hyperion environment.